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THE ELEMENTARY SCHOOL TEACHER AND COURSE OF STUDY

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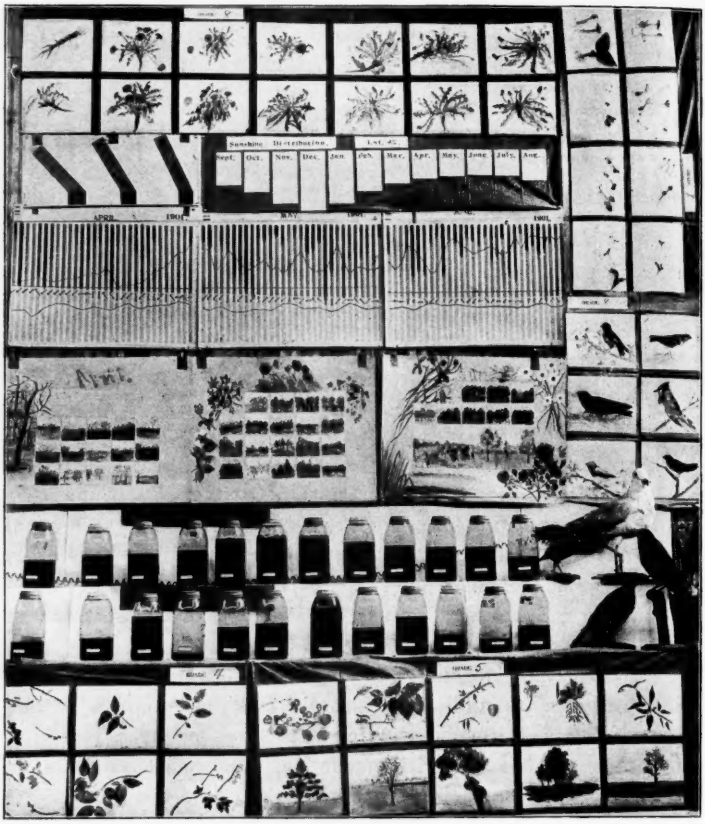
REPRESENTATIVE WORK IN NATURE STUDY.

WILBUR S. JACKMAN.

ASIDE from its industrial aspects, which appear in the various occupations of man, nature study finds its theme in the Rolling Year. The succession of days, of months, and of seasons furnishes a panoramic history of the always completed, yet never finished, year, and the events thus narrated form the great background for everything that is either beautiful or useful in human life.

In this study nothing can take the place of direct contact with nature in its undisturbed forms and under normal conditions. This is primary; the teacher is secondary. The most that teachers have taught in the past the succeeding generations have shown to be wrong, and the same will be true to some extent, no doubt, of the present and of the future. The best, therefore, that any teacher can do for a child is, first, to make him feel that the study of natural phenomena is worth his while, and, second, to afford him some time and opportunity for investigating them. Nature presents herself to the observer, and to children particularly, as a great aggregation or composite. She may appeal to him through any one sense or through all his senses at once. The result is a confused mass of images, among which must be established the proper necessary relationships, if natural phenomena are ever to appear as an organic whole.



A RECORD IN NATURE STUDY.

It is proposed to show in this paper, and chiefly by the accompanying half-tone, how the data obtained through various observations may be graphically recorded, and how they may be so arranged that certain relations shall be clearly obvious.

The most conspicuous, the most sensitive, as well as the most beautiful feature of the landscape is its color. Shifting with every passing cloud, yielding to the slightest breeze, the

sheen of the landscape renders it endlessly attractive to observers, young and old. But even the most attentive will not realize how great the seasonal changes are, so imperceptibly do they usually creep on, unless day by day some permanent record is made. Taking the months of April, May, and June to illustrate how the year's record may be kept, three landscape calendars, near the middle of the picture, show how, day by day, the children painted the history of this season in color. By dividing the room into groups to correspond to the days of the week, one painting may be secured each day, and yet no one need paint oftener than once a week.

The general plan may be varied many ways in its details. It is interesting to select scenes for sketching the present strongly contrasted conditions. In this way the different effect of the same seasonal influences upon various parts of a given area are well depicted. Or, by confining the sketching to one and the same part of the landscape for a month, another kind of history will be painted. Each plan has a peculiar interest of its own.

The three charts above the landscapes record graphically the observations of certain meteorological phenomena. The narrow vertical strips are eighteen inches long and represent (arbitrarily) the day of twenty-four hours. Upon the lower part of the strips (blue on the chart) is measured off the correct proportion to represent the length of night. What remains above (yellow on the chart) represents the daylight. Upon the latter the cloudy days and the rainy days are represented respectively by the lighter and darker shades of gray. The straight horizontal line represents the freezing point. Above and below this, at either end, the edge of the card is graduated as a thermometer. The upper zigzag line shows the curve of mean temperature, and the lower one shows the barometric curve, the card at one side being scaled as a barometer.

Between the two lines arrows are placed which indicate the direction of the wind. Various relationships are easily worked out. The wind that oftenest accompanies clouds, rain, or sunshine; the combination of events that accompanies the low or the high temperatures; the rise and fall of the barometer and the rise and fall of temperature; the relation of both these curves to cloudiness and rainfall; the gradual change in the length of day and night, absolute and relative; the bearing of all combined upon the landscape pictured below — these and many other comparisons may be made at a glance, and all reveal the close interdependence of the phenomena of nature.

Above these charts, by means of the skiameter, the relative distribution of sunshine for the latitude of Chicago is shown for each month. Since the intensity varies inversely with the distribution, and the ratio of the April rectangle is to that of June as 15 to 12, it follows that the intensity of the latter month is one and a fourth times the intensity of the former. In other words, the sunshine that does duty on a fifteen-acre field in April will cover only about twelve acres in June.

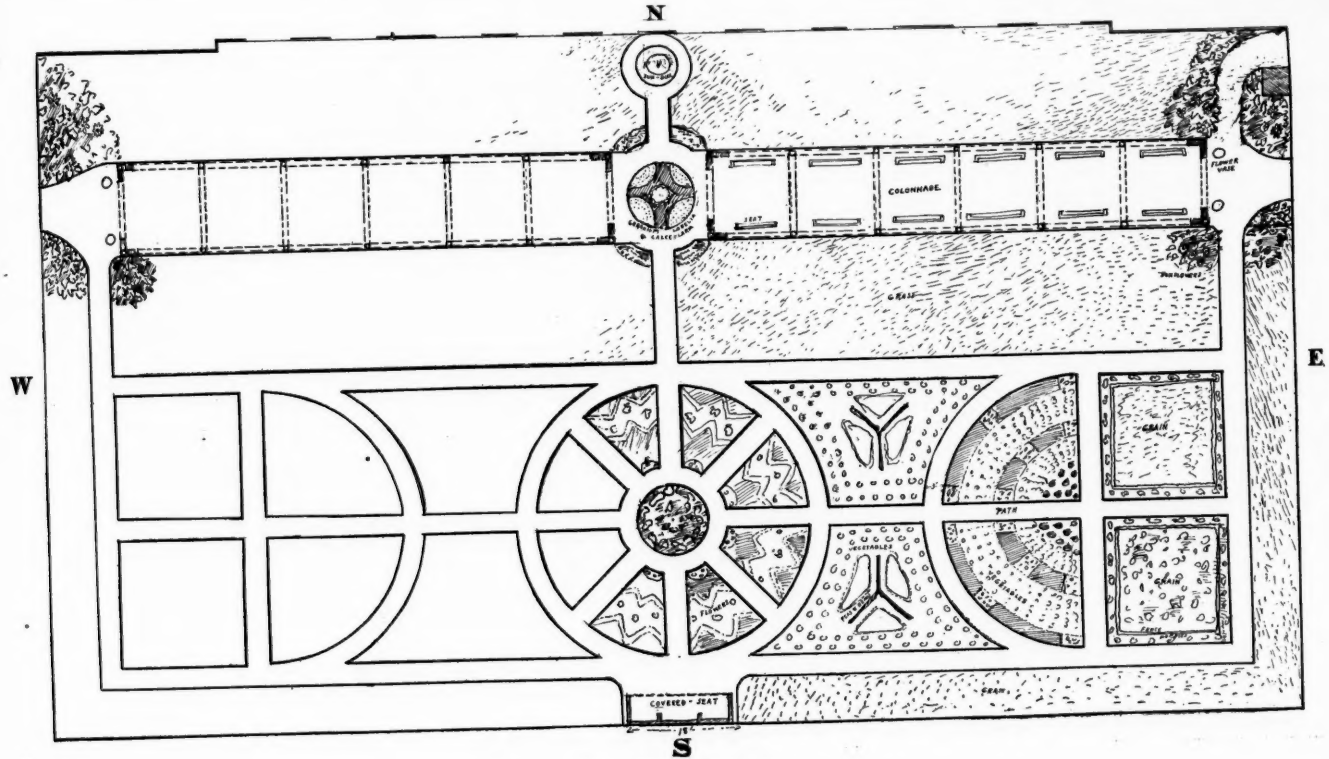
At the left of the chart, three figures show the slant of the sun's rays for each of the three months, and also the area that each beam covers.

The Mason jars below the landscape illustrate graphically the rainfall. Each jar contains the quantity of water that fell in a month on an area of twenty-four square inches, January being on the left. The upper row shows the average for each month during a period of thirty years. The lower row shows the rainfall by months for the year 1901. The upper row shows what nature promises; the lower one shows how she performs — at least, how she did in 1901. During the growing season, the months are marked by important events, as, for example, germination of seeds, opening of buds, flowering, insect development, ripening of fruit. The variation in the rainfall from the average, as told by the jars, shows how the plant and animal world, ourselves included, is subjected to great strains. It gives a striking meaning to the phrase "struggle for existence."

In the upper right-hand corner, the story of the seedlings for these months is told by some plants selected from the garden. At the upper side, a series of paintings shows the chapters of the dandelion's history, which types a large number of plants that spring from roots which have survived the winter. At the bottom, the unfolding of the buds, the story of how the plant makes friends with the sunshine during these months, is told in a similar way. On the right, a few of the birds and the opossum give something of completeness to the season's pictures.

Associated with the observations of the development of plant life are records of the temperature, not only of the air, but also of the soil at different depths and of the water in the ponds. By these means the really complex nature of the environment of the living thing comes to be better understood, and the sensitiveness and plastic character of the organism grows to be more thoroughly appreciated.

Children generally feel, as most grown people have believed hitherto, that the catastrophic events of nature are the most important; but a thoughtful study of the everyday and regular occurrences of the seasons will lead ultimately to the truth that it is the small and apparently insignificant things that really do the world's work.



THE SCHOOL GARDEN.

THE SCHOOL GARDEN.

The garden, this year, is to occupy a plot of ground lying on the south side of the school building 55 meters long, east and west, and 30.5 meters wide, north and south. The south side and the ends are inclosed by a wire netting six feet high, and the north side is bounded by the schoolhouse.

The main cultivated portion is a strip near the south side, 48 meters long and 12 meters wide.

As shown by the diagram, a circular bed 12 meters in diameter will be devoted to flowers, one-eighth of the area being assigned to each grade. A bed in each corner, 6 meters square, will be sown with the spring grains. The four remaining plots on either side of the circular area, each about 6 meters square, will be assigned to the grades as marked, and they will be planted with vegetables.

In the space between the house and the beds it is proposed to construct an arbor, to be covered with quickly growing vines. Within this there will be seats, so that the place may be as attractive as possible for the pupils.

Near the building there are nine beds, in which about one thousand tulip bulbs were planted last fall. After these have finished blooming, their places will be given to plants that bloom later in the season.

On the walls of the building, between the windows, preparations are being made for planting a great variety of rapidly growing vines which it is believed will somewhat soften the glare of the summer's sun upon the treeless grounds. The soil, unfortunately, is not of the best, but by means of compost, to be gotten at the Stock Yards, it can be so improved as to be fairly adapted for the purposes of the garden.

This is the general plan; the details will appear in subsequent numbers of the ELEMENTARY SCHOOL TEACHER as the season advances and as the work is being done.

PHILOSOPHY OF EDUCATION.

BERTHA PAYNE.

THE general study of play, begun in the fall quarter, has been the point of departure for a closer study of mental development through play and work, the relation of mind and body, and the reaction of mental upon bodily states, and *vice versa*.

We first summed up roughly the elements which usually enter into children's play employments. Each member of the class described a play that he had seen, indicating the exhibition at various stages of impulse, instinct, imitation, discovery, experiment, invention, purpose, and plan. A typical record is given below by way of illustration.

I noticed a little boy take a picture chain from his pocket — stimulus. His impulse was to attach it to something. By accident he placed the chain over a horizontal bar. He then discovered that by pulling one end of the chain he raised the other. This was something like an elevator. His next step was imitation — making it more like an elevator. He placed his lunch basket on one end of the chain and filled it with papers for cargo. Imagery of past experiences with elevators furnished material for his building. He now had a definite purpose — to make as good an imitation elevator as possible. A place for unloading was made some distance from the floor, and inventive situations requiring other children to load and unload were brought in. — *Marion Hopkins.*

A child sees a pool of water, and his first impulse is to throw something into it. He acts instinctively, entering upon a form of activity without any definite aim. He sees that the light piece of wood which he has thrown in floats, while some things sink. He discovers that the piece of wood is like a boat. Imagery is extended to other floating things. Invention begins when he plans a toy boat. Experiment and imitation appear when he tries to make a boat similar to those he has seen, to balance it, and to fit its parts together. — *Helen Morrison.*

Observation of the force of impulsive movement in play led to a study of impulse and sensation. To simplify the problem, we reviewed the mental and physical condition of a child in earliest infancy in the following order:

(1) Outward signs of mental life. (2) Mental movement that may be inferred from these signs. (3) Facts of mental life as given by Preyer and Baldwin. (4) Physiological equipment at birth — brain, spinal cord, nerves. (5) Froebel's conception of the meaning of infancy.

Some attention was given to the following:

(1) Spontaneous movements. (2) Automatic movements. (3) Reflex movements. (4) Acquired reflexes. (5) Controlled movements in response to stimuli received from eye, ear, touch, etc. (6) Co-ordination of movements. (7) Co-ordination or association of perceptions and appropriate movements. (8) The process of learning to direct movement through gradual command of what was at first involuntary or spasmodic. (9) The larger acquisition of percepts and images through self-initiated movements. (10) The meaning of self-activity in this earliest acquisition of knowledge and of powers. (11) Froebel's statement of this as "self-consciousness." (12) Types of imagery: visual, auditory, motor, tactile, olfactory, and gustatory. (13) Localization of function.

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As a result of this study of the development and differentiation of psychic processes, several stages have been noted. These stages are significant to the teacher, not because she deals with the education of infants, but because they illustrate the upward spiral of growth. The necessity of full and complete exercise and nutrition at each stage, that the succeeding stage may follow at its best, is a physiological and psychological demonstration of Froebel's precept: "Give to each stage that which the stage demands."

The first stage with which the school is directly concerned is that of play merging into work, or, at the youngest kindergarten age, pure play, imitative, experimental, dramatic, and constructive. Leading up to this stage we note the following:

1. Period of spontaneous and reflex movement through which sensations, percepts, stimulus to controlled movement, and power of control begin to be acquired.

2. Period of increased sense-perception, image-forming, and acquisition of co-ordinated movement; sense of personality begins to show in response to touch and presence of different individuals.

3. Interpretation of world of objects in real significance; recognition of persons; memory; discovery of personal agency in producing effects.

4. Speech and locomotion enlarge the world of experiences; imitation furnishes new modes of control and a larger acquaintance with persons and their feelings and desires; stronger bond between self and others.

5. Interpretation of the world of persons and things through imitation, dramatization, and creation of new meanings for familiar objects; play in its

higher sense; discovery of new uses and combinations; selection of means to an end.

6. Forming ends to be reached by processes which may or may not be pleasurable in themselves; means are tried and rejected or modified, involving deliberation, comparison, judgment, and conscious plan; the more remote the end, and the less it is pursued for the enjoyment of the process of realization, the more the work element enters and play retires.

An incidental study was made of the children in the school. Each student spends an hour a day in the elementary school, either teaching or observing. This has given a good opportunity for watching the reaction of children to the various stimuli presented in every form of study. The class studied the predisposition of children to response, dividing them for convenience into motor and receptive, or passive, types. A great number were left in the middle or normal class. This led to the analysis of causes of the apparent passivity which was scheduled by the class as due in many instances to one or more of the following conditions:

(1) Timidity; (2) physical condition, as lack of nutrition, or fatigue; (3) lack of experience on the subject in hand, when responsive in some subjects and not in others; (4) deficiency in some type of imagery, as when unresponsive in certain forms of expression and not in others; (5) general dulness or slowness, where stimulus is not easily turned into action.

Questions:

1. What arguments have you on the physiological side for the use of all forms of expression in school? On the mental side?

2. What is the special reaction of each form of expression upon imagery?

3. What use can be made of your knowledge of types of imagery with different children in your group?

4. What answer have you to the following statement: "The first business of the teacher is to fit the boy and girl for earning a livelihood. This means for the children, first of all, an accurate and rapid acquisition of the processes of reading, writing, and arithmetic"?

OUTLINE FOR MARCH.

The work for March will be a continuation of the subjects of imitation and suggestion, and will include dramatic play on the side of pedagogy. Habit, memory association, and attention will be discussed.

HISTORY.

EMILY J. RICE.

MEDIÆVAL HISTORY IN THE ELEMENTARY SCHOOLS.

WITH the introduction of active work into the schools, manual training, domestic science, and the applied arts, reproducing among the children the various phases of real life, there arise before us many new problems in regard to the curriculum. The question of amount of subject-matter to be taught is no longer the only important one. We must also consider the social use of the occupations and the relation the subject-matter shall bear to these occupations. So far it has been customary to add the handicrafts to the curriculum, and to try still to do the same amount of work in the old studies as before and in the same way. The result is an overcrowding of the course of study, and a consequent discouragement of the teachers. In order to make a success of the new curriculum there must be some modification of the old subjects, some relation found between the new and the old.

The value of the industries depends not only upon the amount of skill acquired, but also upon the spirit in which the work is done. Everything made should be useful, that is, made for use. Doing useful things gives the children a feeling that they are of service in their small community—the school or the home. It brings back something of the spirit that sharing in the household industries gave in the days of our ancestors. If children merely acquire for themselves throughout their school life, we cannot expect them to be afterward truly social in action. While deploring "child labor" under our modern economic system, we are in danger, both in the home and in the school, of the opposite extreme—education to uselessness. It is possible to organize the fundamental occupations so that the children shall have work to do which is within their power, work which they can enjoy, and which will give them artistic training.

The natural relation that exists between the occupations and

the subjects of the old curriculum is that the knowledge of materials and processes necessary to work shall lead to investigations in science and history. The children who are themselves engaged in any industry are naturally interested in the work that is going on around them in the community. Questions arise in their minds regarding the nature of the materials used, the processes of manufacture in earlier times, and the relation of the industry to social conditions. Thus they may be led to lines of investigation which are really in their nature the study of science and history. If we abandon the idea that study must begin at the opening chapter of a text-book and proceed according to the system there set forth, or chronologically, and, instead, allow the order of topics to follow suggestions that grow out of the use of materials, the children may enter the fields of knowledge by the natural channels of their own social needs. They are thus making themselves useful by what they do, and the questions that arise in their work lead them to study. They are gaining not only habits of industry and of social service, but also knowledge of subject-matter and power to apply their knowledge. Such a plan binds together occupations, civics, and history, and simplifies the course of study. It is education through labor, and yet as broad as science, literature, and art can make it. By helping the children to do creative work in school we may hasten the day when everyone shall find joy in work as well as in leisure.

The following is a plan of work for the seventh grade of the Elementary School of the School of Education (children averaging about thirteen years of age):

I. OCCUPATIONS.

Printing, bookbinding, sewing, embroidery. The children print and bind such material as is useful for the school. A hand press, or "proving" press, seems best for school use. By selecting good type for printing and giving the children a study of design for book covers, some artistic work may be accomplished. The embroidery begins with designs on linen for book covers, and the sewing is chiefly making simple garments and costumes needed in the dramatic representations of the school.

II. CIVICS.

The modern home, domestic architecture, interior decoration and furniture, the tenement-house problem.

III. HISTORY.

Studies in the Middle Ages.

ORDER OF TOPICS.

Occupations: printing, illuminating, bookbinding; stories of the invention of printing and of famous printers — Gutenberg, Aldus, Plantin, the Elzevirs, Caxton, William Morris; history of bookbinding; bookbinding of today; illuminated manuscripts; the scriptorium; St. Benedict and Monte Cassino; St. Francis of Assisi; Giotto and his paintings; Giotto's Campanile; the city of Florence — public buildings; life of the people; Florentine artists; Florentine gilds; life of the artisans; trades unions of today; Nuremberg; Hans Sachs and the Meistersingers; the feudal estate; life of the serfs; life in the castle; the crusades; Venice and its trade; occupations — sewing and embroidery; the tapestries of the Middle Ages; the modern home; domestic architecture; interior decoration and furniture; the tenement-house problem; an ideal home.

REFERENCE LIST.

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II. Printing.

1. Invention of printing.

Larned, *History for Ready Reference* (controversy regarding inventor); Pearson, *Gutenberg and the Art of Printing;* De Vinne, *Invention of Printing;* De Vinne, "Gutenberg," *Scribner's Monthly*, Vol. XII, p. 73; "Gutenberg," *Encyclopædia Britannica.*

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Lang, "History of the Elzevir Press," *Magazine of Art*, Vol. VII, p. 287; Salvador, "Elzevirs," *New Science Review*, Vol. I, p. 333; see also books on the history of printing.

6. Caxton.

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7. William Morris.

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VI. The Benedictines and Monte Cassino.

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VIII. Giotto: paintings in Assisi; Arena Chapel in Padua; Santa Croce in Florence; the Campanile.

Quilter, *Giotto di Bondone;* Perkins, *Giotto;* Ruskin, *Giotto and His Works in Padua;* Ruskin, *Shepherd's Tower;* Layard's-Kugler, *Handbooks of Painting*, Vol. I; Jameson, *Memories of Italian Painters;* Berenson, *Florentine Painters of the Renaissance;* Vasari, *Lives of the Painters* (edited by Blashfield and Hopkins); Radcliffe,

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ELEMENTARY MATHEMATICS.

GEORGE W. MYERS.

THOSE who look with disfavor upon teaching elementary mathematics as an aid to the other subjects contend that the advocates of this practice are only seeking to make school work easy. This argument, however, can carry weight only with those who have not yet attempted to bring elementary number-teaching into this relation. All teachers who have had experience know how much more difficult it is to teach number and at the same time to make it *tell something* to the pupil, than it is to teach number as a separate and unrelated subject. The former demands no less facility in technique than does the latter, while it requires much more exercise of judgment and choice of points of attack. It would be much more to the point to argue against this practice in elementary mathematics on the ground of its extreme difficulty.

The only strength the argument derives from practice is that teachers "without a margin" of scholarship find the practical difficulties so great that they do not work the theory up to its possibilities. This is all the more true from the fact that previous training unconsciously draws the teacher back into the well-worn channels of pure form- and symbol-teaching. But the few who have persisted find the road grows easier as the evidences of growth in the pupils' power to use this invaluable tool become

more frequent and more convincing. The tyranny of theory yields, though doggedly, to persistent well-doing.

Successful teaching of this sort means directly the opposite of "dawdling with applications," of spineless thinking—it means attentive interest, virility and steadiness of thought—it means not alone skill, it means the right use of skill—it means *power*. But this is said only of successful teaching, which does exist, though in not so great a degree as could be desired. Let every earnest mathematical teacher, from first to last, close his ears at times to current pedagogical din, and put to himself the question: "Is the purpose of my teaching primarily to secure *technique*, or *power to reason, to think?*" and if he can conscientiously answer *technique*, save to atone for the neglect of previous teaching, every purposeful pupil has reason to hope that he may have no part nor lot with such a teacher.

OUTLINE FOR DISCUSSION AND STUDY.

I. Suggested number plan for Grades I to IV.

Study of strength of timber.—1. Have one of the later grades cut out and plane down half a dozen sticks to $24 \times \frac{1}{2} \times \frac{1}{2}$ inches of pine, ash, hemlock, hickory, elm, red oak, and white oak.

2. Distribute these to the class, and have pupils examine the grain and other qualities by which they can identify the different varieties.

3. Provide each pupil with a sample of each variety to be studied; have pupils measure length, breadth, and depth; and record the measures in metric units. How long is the stick? how broad? how deep?

4. Support one of the sticks at the ends on chairs, or otherwise, and require pupils to find by measurement the middle, and to attach weights (a light weight first, then gradually increase the weights) by a string to the stick at this middle point. What is $\frac{1}{2}$ of 24 inches?

5. Lay a straight bar (meter or yard stick) along the top surface of the stick and notice how it changes its form as the load is increased. For each load measure how far the stick "sways" at the middle below the edge of the straight bar. Record these measures.

6. Load the stick until it breaks. Record the breaking load and the "bend" just before breaking in columns of a little table. (*a*) What was the greatest bend before the stick broke? (*b*) What was the weight of the load that broke the stick? (*c*) What was the "bend" for each load before breaking? (*d*) What was each load? (*e*) One beam bends how many times as much as the other?

7. Treat each beam in this way. (*a*) What load broke the pine? the oak? etc. How much greater was the load required to break the oak than the pine, etc.? (*b*) What was the "bend" of the pine before breaking? the oak? which bent the more, and how much? (*c*) Which wood is the strongest, and how much? How many more pounds or grams did it hold than the next strongest? (*d*) Which is the weakest wood? How many more pounds or grams did the strongest hold than the weakest? (*e*) Which stick bent most? Answer in inches or centimeters and parts of an inch or centimeters.

8. Now distribute some 12-inch sticks and experiment as before, loading the sticks at the middle. Which holds more and how much, a 24-inch or a 12-inch pine beam? oak? hemlock? etc.

9. Take 24-inch sticks first, then 12-inch sticks, and load equally at the quarter points. (*a*) What is $\frac{1}{4}$ of 12″? $\frac{2}{4}$ of 12″? $\frac{3}{4}$ of 12″? $\frac{4}{4}$ of 12″? (*b*) What is $\frac{1}{4}$ of 24″? $\frac{2}{4}$ of 24″? $\frac{3}{4}$ of 24″? $\frac{4}{4}$ of 24″? (*c*) What is $\frac{1}{2}$ of 24″? of 12″? $\frac{1}{2}$ of 24″ is how many fourths of 24″? (*d*) The long stick is how many inches longer than the short stick? How many times longer? (*e*) The long stick would make how many of the short sticks? (*f*) What is $\frac{1}{2}$ of 24″? $\frac{2}{2}$ of 24″? $\frac{3}{2}$ of 24″?

10. How many pounds or grams were at each quarter point when the stick broke? How many at all three of the quarter points?

11. In which case did the stick carry more, and how much more, when the load was all at the middle, or distributed at the three quarter points? How was this with the shorter sticks?

12. In which case did the stick "bend" the more, and how much, when loads were distributed, or with single load at center? How was this with the shorter sticks (12″)?

13. What is the best kind of timber for heavy loads, where it is not desired to have pieces too large?

14. What is the best way to load the stick to keep it from breaking, one load at middle, or one-third as much at each of the three-quarter points?

15. Can you lift as much weight as was needed to break the stick? more? how much more or less?

16. Now it would be well to study sapwoods, heartwoods, woods between sap and heart.

NOTE 1.— In each case do not fail to bring out the *number fact.* Allow the pupil to answer by *measurement.* At close of each recitation summarize the number facts used in a three- to five-minute review and drill. Facts of the addition table or multiplication table should be written by the pupil in a notebook, or on the board, and kept handy for reference.

Do not fail to observe note 1.

NOTE 2.— Only the salient number facts are specified in this outline, just enough to suggest the mode of proceduce.

NOTE 3.—Materials must all be prepared and ready before the number recitation. The manipulation *does not belong to number teaching.*

II. Questions.

1. How many lessons are needed for this?
2. What grade of maturity is demanded?
3. Will the girls be interested? Try it.
4. Criticise in some other way than to cry "too hard!"

ART.

JOHN DUNCAN.

SOME questions with regard to the teaching of drawing reappear from time to time, and the following is an attempt at replying to one or two These paragraphs form a condensed report of a discussion in the pedagogic class put into the form of question and answer.

Q. Is it enough to provide opportunities for drawing, while the work is left undirected?

A. This is analogous to turning children loose on a field excursion and calling the meager results "nature study." Teachers must see to it that these opportunities in each case are properly used.

Q. To state the same question in a different way, do you not think the children get a good deal in the mere practice of drawing?

A. All "busy work" with the pencil or paint brush is not educative drawing; it may be the worst kind of industrious idleness, blunting the sense and corrupting the taste.

Q. How should one criticise children's drawings?

A. There should be no destructive criticism. One should say, "Thus the line should go," "Let me show you how to mix the tint;" never, "Your colors are false!" or "Your lines are askew!" Elicit the child's own ideas by question and suggestion; help him to realize *himself;* if need be, lift him *over* an obstacle in his path, if it fret him overmuch.

Q. I saw you doing a face for one of the children of the eighth grade. Do you think that was the right thing to do?

A. In that particular case, yes! The boy's critical power had far outrun his skill; he could not do the face in such a way as to satisfy himself, and if I had not drawn it for him, the time would have been consumed in fretting. As it was, he settled down to the work and made something of the rest of it. Next time he will at least be better able to deal with the more difficult parts of the drawing, having felt his own powers in motion and gained some little confidence in himself in the doing of the rest of the work. Neither he nor I deceived ourselves into the belief that the drawing was other than our joint production.

Q. Can a teacher instruct or direct work in which she is not herself competent?

A. Origen has said: "Never teach pupils anything that you do not yourself practice." (That means, never *pretend* to teach, for it is impossible to teach something in which one is not wise.) It seems to me that that is a very good and sound educational principle. Of course, to refer back to the illustration from nature study, I do not mean to say that the teacher who is incapable of directing her pupils in science should keep them indoors all the time; the teacher must allow her children to draw, though her active participation would only hinder and not help them.

Q. Should we begin with something easy?

A. Progress is not necessarily from the easy to the difficult, but, as Spencer puts it, from the homogeneous to the heterogeneous, from the general to the particular, from the vague to the definite. One thing is in one sense as difficult as another; we call a thing difficult when we are critical with regard to it, when we see deeply into it. For example, most of us would be satisfied with a very general representation of a horse and make no demand for any very specific details of particular breed or kind. But in a picture of a human being some account must be given of the race, age, and sex, or the least critical of us would remain unsatisfied with the representation. The child's first drawings are such generalizations, and he does not find it any more difficult to make a summary representation of a man than of a three-legged stool. It is the grown-up critic who remains unsatisfied; the child has a modest gratification in his very partial success.

Q. Should children be allowed to copy?

A. All art is more or less conventional — much more so than is generally supposed. A picture is a symbol only certain degrees less abstract than written or printed letters. We all learn to read the language of pictures early; most do not learn to write this language at all. In copying, one is learning to shape the symbols of pictorial ideas, and copying is as necessary a part of an artistic education as learning to write is of a literary education. It is a way of learning technique, and more — it is a way of reading into other and greater artists' conceptions, and of adding them to our own. The desire for self-expression is the central controlling force, all the rest is postponed to that. If the teacher provides the proper conditions the desired skill will come almost entirely subconsciously under the stress of something to be expressed. As the teacher writes before the children, she must draw before the children, and as this kind of language-writing is so infinitely more complex than calligraphy, an infinite number of models must be placed before and around the pupils, so that when the child needs any form to help to express himself it is at hand for reference.

This is an altogether different thing from the teacher's setting something down arbitrarily before the child to copy, something which she thinks is in a

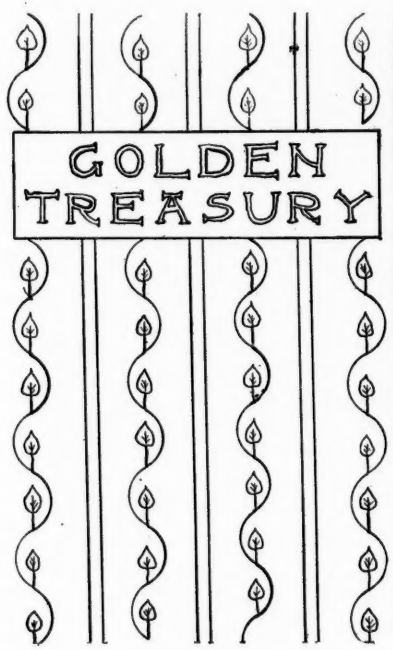
Spring.

Summer.

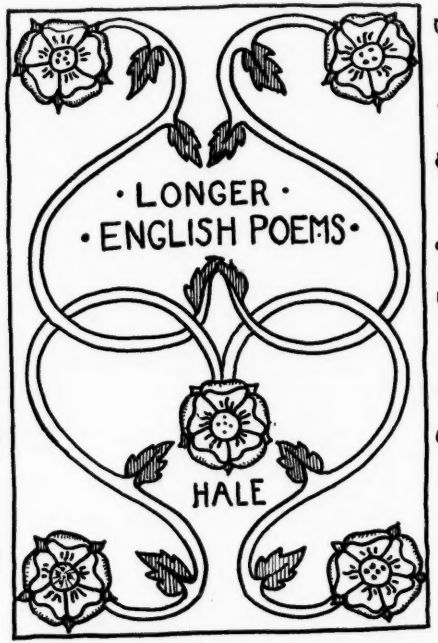
Autumn.

STENCILED PANELS, NATURAL SCIENCE LABORATORY.
By class in decorative painting.

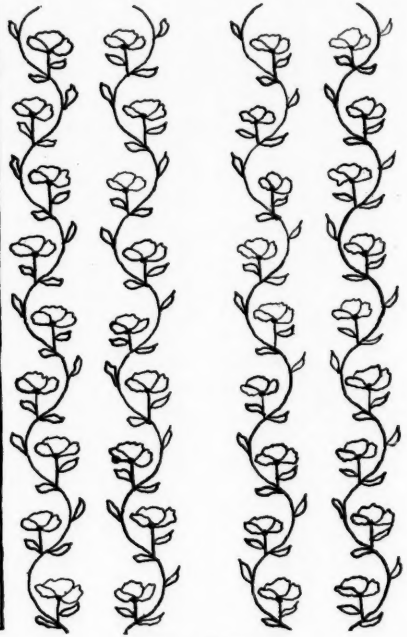
(See articles on "Decorative Painting," under "Applied Art," in the November and December issues.)



BOOK COVER.
—Nina Marion Lunt.



BOOK COVER.
—Frances Maine.



WALL PAPER.
—Nina Marion Lunt.

general way good for him. The contact between the thing and the child's soul may not be established, whereas in the other case the child uses the thing he copies as a channel for his self-expression; he uses it to liberate and to invest with power his own creative energy. We ought to have a great many pictures and casts in the schoolroom.

MANUAL TRAINING.

IRA M. CARLEY.

THE seventh grade has completed a set of sewing benches for use in bookbinding, a working drawing of which is presented with this. This simple piece of apparatus is made as follows:

A platform strengthened by cross-pieces screwed underneath, 2½ inches (to center) from the front edge of this platform; parallel to it, a slot (*S S*). At either end of this slot is an upright wooden screw upon which work the wooden nuts *C* and *D*, which serve to adjust the horizontal rod *E F*. The cord which is sewed in the back of the book is fastened to the horizontal rod and, passing through the slot, is secured underneath the platform and kept taut by turning the nuts *C* and *D*.

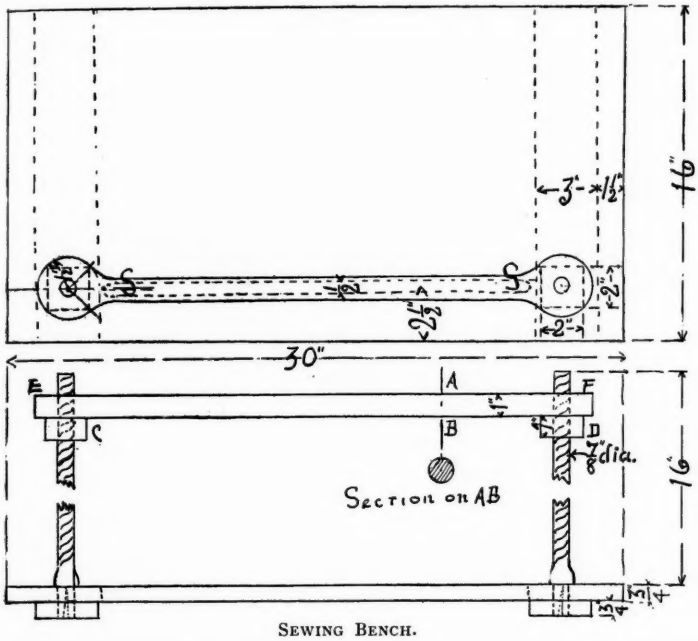
For the wooden screws and nuts cabinet-makers' hand-clamps were used, the handle ends being turned down to ¼ inch, with a shoulder to fit tightly to the surface of the bench.

As a further help in its work in bookbinding, the grade is planning a heavy vise for holding the books in smoothing the ends and shaping the backs, and also a strong screw-press for flattening the books when bound.

In the upper grades a number of pieces of individual work, both in wood and metal, are being undertaken, and, when these are completed, photographs and working plans of the best results will be presented.

The most interesting piece of work which is being done for the benefit of the whole school is the out-of-door gymnasium. Early in the year the children were asked to offer suggestions for this gymnasium, and a number of sketches, as well as several models, were brought in. These were shown to the classes which would be most directly concerned in the building, and a general plan was decided upon, although many details were left for further consideration.

It was decided that a space 18 feet square should be laid off, at each corner of which should be erected a post 20 feet in height, and that on the tops of the posts, forming the sides of a square, should be placed timbers to support the hanging apparatus. After testing pieces of white pine, Norway pine, and spruce (of sections ½ × ½ inch), it was decided that timbers



SEWING BENCH.

6 × 6 inches of white pine would be strong enough for all the main framework, and these were accordingly procured and have been made ready to set up. From one horizontal beam it was decided to suspend four round climbing poles and two climbing ropes.

The poles have been made from 1⅞ × 1⅞ inches clear, straight-grained Oregon fir. In making these, a square representing the section of the piece furnished was drawn, and the corners marked off to form a regular octagon; this measurement was then laid off from each edge on each surface of the piece to be rounded, and a line drawn the entire length; the pole was then planed to a regular octagon in section, then to sixteen sides, and then rounded, and afterward filed and sandpapered.

For fastening the ropes and poles to the horizontal beams, wrought-iron

bolt-hooks, to pass through the timbers, and iron clamps to bolt to the upper ends of the poles, are being made in the forge-room.

On another side of the square are to be four ladders 16 feet in length, which may be used either vertically or obliquely. The rungs for these are now being made from 1 × 1 inch hickory, the piece being first planed sixteen-sided, and then finished round in the lathe and the ends cut exactly by means of a "spoke-auger."

The description of this outdoor gymnasium will be continued as the work progresses.

TEXTILES.

CLARA ISABEL MITCHELL.

THE outline below is for a year's work in the textile arts, with suggestions as to lessons in related subjects.

FIRST GRADE.

Basketry.— Bags, baskets, and mats of braided raffia; small baskets of rattan.

Weaving.— Holders and mats of coarse carpet yarn, wool or cotton roving; curtains, rugs, and hammocks of coarse yarn for the doll-house, roving, or raffia; small rag rugs or mats.

Sewing.— Dust cloths of cheese-cloth cat-stitched with cotton yarn.

Embroidery.— Pen-wipers, needle-books, blotters, pin-cushion covers; small mats of canvas, linen, or leather, with cotton, linen, silk, or worsted threads.

NOTE.— Children's designs for these articles are, in most cases, corrected and traced on the material by the teacher.

Nature study.—Talks about clothing as protection to people. Use of cotton, linen, wool, silk, skins, fur, and felt. A few characteristic specimens of each kind of fabric classified, marked, and kept as part of the school museum. Examination of cotton plant; flax in various stages of manufacture; wool fleeces, yarns, and fibers, scoured and unscoured; the silk cocoon, worm, and fiber; animals' coats and furs. Planting and raising of cotton and flax in the window-box.

Simple stories and pictures of workshops, pastures, and factories where clothing processes are carried on. Lessons on the coverings of familiar plants and animals. Uses of skin, scales, hair, fur, wool, feathers, and shell, and adaptation of each to use.

History.— Stories about children of countries and civilizations different from our own— Eskimo, Indian, Chinese, Javanese; how they are dressed, and how they get their clothing.

Geography.— Excursions to sheep farms, factories, mills, and shops in which are carried on the weaving, spinning, designing, and sewing of clothing. Pictures of shepherd life, ranches, and herds; cotton fields; silk, linen, wool, and cotton industries. Lessons on the country, climate, and customs of the Eskimos, North American Indians, Javanese, Chinese.

Number.— Use of footrule in making small looms. Combinations and partitions in the number 12, learned and written as used. Use of yardstick in measuring yarns. Relation of foot to yard and of yard to foot. Relation of yard to half-yard; half-yard to yard; 36 to 18; 18 to 36. Square, triangle, oblong, and circle learned in making of designs.

Stories.—"Fair Snowwhite," "Arachne," "Robert Bruce and the Spider," "The Life of St. Bridget," "How Peggy Got a Pair of New Stockings," childhood of Giotto.

Songs.—"Spin, Lassie, Spin," "Baa Baa Blacksmith," "Little Bo Peep," "I Love Little Pussy," "The North Wind Doth Blow," "Foreign Children," "Fair Snowwhite."

Drawing and painting.— Recollection of things seen on excursions; illustration of history and geography lessons; designs and working drawings of things to be made; studies of cotton plant, silkworm, and flax plant; pupils dressed in costume of the countries studied; animals which illustrate peculiarities in covering.

SECOND GRADE.

Spinning.— Limited amount of wool and flax.

Dyeing.—Wool and cotton yarns stained with natural dyes. Experiments with iron rust, onion, coffee, tea, beet, berries, and barks and roots of familiar plants; cochineal, logwood, fustic, madder, indigo, Brazil wood. Alkalies, acids, and salts used as mordants.

Weaving.— Home-made and home-dyed yarns woven into mats, bags, cushion covers, holders, curtains, and rugs for playhouses. Baskets of rattan, Indian splints, raffia, native grasses, and reeds.

Needle-work.— Cross-stitch and crude satin-stitch patterns sewed in canvas or linen for mats, cushion covers, book-covers, and bags. Dressing of dolls needed for the playhouses or toy theater, for dramatization of stories, history or geography lessons.

Nature study.— Practical use of acids, alkalies, and salts in dyeing. Action, first of strong acids, then of dilute acids, on wool, cotton, linen, and silk fibers. Effect of alkalies. Use of litmus. Experiments to show effects of sunlight, soap, water, boiling, acids, and alkalies upon colors of dyed fabrics. Colors of the spectrum seen through the prism. Lessons on the coloration of fruits, flowers, leaves, insects, birds, and other animals; how coloration seems to affect the life and habits of individual plants and animals. Colors of our own landscape. Recording changes in color of landscape with rise and fall of temperature. Inventions in spindles, heddles, shuttles, and needles.

History.—Theories as to beginnings of the textile arts. Stories of earliest weaving. Mats, curtains, and baskets among cave men and Indians. Discovery of linen. Exchange of amber for wool leading to commerce. Inventions in textile processes — spindle, distaff, wheel. Methods of getting clothing in the period of hunter life. Domestication of animals leading to shepherd life. Early Aryans and ancient Hebrews as illustrations of shepherd life. Change from shepherd to agricultural life. Ancient lake dwellers of Switzerland. Methods of transportation among the peoples studied.

Geography.—Stories, pictures, and stereopticon views of the routes over which textile fibers and fabrics are transported from their sources to our own city. Excursions to wharfs, freight-houses, and warehouses. Nomads of Arabia as present types of shepherd life. Deserts and life in the deserts. Excursions to sand dunes, to oriental rug shops, to botanical gardens to see specimens of tropical vegetation. Stories and pictures of the cotton-growing regions of our own country, of the West Indies, of Egypt, and of India. The forests from which dye-woods are gathered. Forests and mountains as background of hunter life. Plains and highlands as grazing grounds. Valleys as agricultural regions.

Number.— Use of footrule in making loom. Halves, fourths, thirds, sixths, and twelfths of a foot; combinations in 12; yard. Use of metric scale in weighing of dye substances. Table for liquid measure as needed in measuring water in dyeing. Square inch, square foot, and square yard in making designs. Use of compasses in making of circle; use of terms "radius," "diameter," "circumference," and "area." Telling of time. Table of time. Table of United States money; making change inside of one dollar; keeping of expense books and accounts within one dollar; processes of addition, subtraction, and multiplication with use of symbols — all to be taught as needed in the buying of materials.

Literature.— Bible stories of Abraham, Isaac, Jacob, and Joseph as expressive of shepherd life. Indian myths as belonging to hunter life. Stories and verses emphasizing the colors in flowers, trees, fruits, leaves, insects, birds, and other animals; change of season; wind, frost, clouds as partial causes of the color changes of the year.

Songs.—"The Ladybird," "Come, Little Leaves," "The Garden Bed."

Drawing and painting.— Subjects similar to those for the first grade. Special emphasis on the coloration of the animals and plants studied.

HOME ECONOMICS.

ALICE P. NORTON.

COOKING IN THE PRIMARY GRADES.

ONE of the common objections to the introduction of cooking into the schools is the lack of time for such work.

Whatever is true in the upper grades, experience has shown that in the primary classes the cooking may be an actual economizer of time. The children are so eager for the work that in order to accomplish it they will readily undertake what might otherwise be drudgery.

A series of lessons is here given somewhat in detail to illustrate the method of teaching reading, writing, and number by means of the cooking. They were given by Miss Mitchell to the second grade and reported by a member of the pedagogic class. The italicized words were written on the blackboard:

LESSON I.

"Some children from the North Side school are coming to luncheon with us soon. The third grade is to make grape juice for them. Suppose we make *apple jelly*. Does anyone know what that says? Yes, apple, but there is more than that; it is apple jelly. Who knows what we shall need to make it? Let us make a list. Of course, *apples* first; then," at the suggestion of the children, "*water*, *sugar*. To make the jelly we must *strain* the *juice* through a *muslin bag*, and put it into *glasses*.

"When we cook we must know just how much of everything to use. How can we tell exactly how much sugar we need? We could measure it, but there is a better way; we can *weigh* it. Let us write this — *we will weigh the sugar*.

"Suppose we learn how to use these scales today, so that when we make our jelly tomorrow we can go right to work. We can pretend this sand is sugar."

The scales were then studied, and directions given for balancing, and the children practiced till they could weigh correctly, not only one, five, seven grams, etc., but halves of a gram.

LESSON II.

When the children were seated around the cooking table, each one provided with the necessary utensils, the following directions, printed upon a slip of paper, were given to each child:

Rule for Making Apple Jelly.

Clean the apples.
Cut them into quarters.
Cut out all specks.
Put the apples into a kettle and cover them with water.
Boil slowly till the apples are soft.
Strain through a muslin bag.
Add 324 grams of sugar to each pint of juice.

Boil for twenty minutes.

Pour into glasses set in hot water.

Place in the sunlight and cover with netting.

No one was allowed to work till he could find out from these directions what to do. Each child was eager to get the meaning of the printed words, for he longed to be doing. The teacher furnished all necessary help, giving unfamiliar words when requested, and in a surprisingly short time everyone could read to her the directions, showing that he knew how to go to work.

The apples were then prepared according to the directions, cooked, and poured into a bag to drain until the next lesson. The bowls receiving the juice were labeled, that everyone might have his own; and each child washed the dishes he had used.

LESSON III.

The children studied the liquid measures — the cup, pint, quart, gallon — in preparation for the measurement of the apple juice. Using water as the liquid, by their own experiments they found out how many cups make a pint, how many pints a quart, and how many quarts a gallon. As in the case of the weighing in the first lesson, this involved, not only addition, but the study of the fractional parts one-half and one-fourth. The learning of the table for liquid measures followed — a very simple process after it had been worked out by the children.

LESSON IV.

The children, seated about the cooking tables, were given the juice prepared on a previous day, and the printed rule. Each child read over for himself the directions and found the place to resume work. He then measured his juice in the half-pint measuring cups and wrote on the board a statement of the quantity measured, as, for example:

"I have half a pint of apple juice."

"I have three-fourths of a pint of apple juice."

Help was, of course, given when needed, by the writing of the unfamiliar word on the board and erasing it immediately.

The next step was the deciding of the amount of sugar required for each one. "The rule says 324 grams of sugar for each pint of juice. How much sugar will Gardner need? He has half a pint of juice. Yes, a half of 324 grams, but how shall we find out how much that is?" This was a difficult problem, but at last one child suggested that they might take one-half of 300, and the question was solved in this way:

$\frac{1}{2}$ of $300 = 150$.

$\frac{1}{2}$ of $24 = 12$.

$150 + 12 = 162$.

In the same manner the problem was worked out for each different amount of juice, and each child weighed out the required amount of sugar. He then completed the jelly according to the rule.

One thing was especially noticeable in this lesson. Each child was alert to get the result of the number work in order to make the jelly, and with this immediate end in view he grasped this difficult problem far more quickly than he had solved easier ones without the same incentive.

LESSON V.

A writing lesson in the class-room was given in which the children wrote the rule for the jelly in their cookbook, from memory.

LESSON VI.

The serving of the jelly as part of a luncheon given to invited guests.

SPEECH, ORAL READING, AND DRAMATIC ART.

MARTHA FLEMING.

As OUTLINED last month, the pedagogic class took up the study of Washington and Lincoln with the intention of arranging the results into a form suitable for presentation on a program.

After the general discussion in the class we made a list of topics for special study. Each member selected the topic on which she thought she could write best, and presented her paper to the whole class for criticism and suggestions. Next we decided to rewrite these papers and embody their substance in language adapted to public speaking, and so simple and dramatic that it would be easily understood by the children. Three minutes was the time allowed for the delivery of each speech, and every effort was made to reduce the time to two minutes. The work required a thorough knowledge of the history, and included practice in oratorical writing, in writing for children, and drill in delivery.

Below is an account of the work from the standpoint of one of the students:

The Gettysburg address was one selection of literature given to the class for oral expression. In order to read it with any meaning, some appreciation of the times and conditions which had given rise to it was necessary, but I confess to a most perfunctory interest in the whole subject at first.

When the subjects for the class work were selected, I chose to write and speak of the Emancipation Proclamation, because it seemed to me the great act of Lincoln's life. I believed I could write best on what I felt most deeply.

Later on the suggestion was made that, as these subjects were to be given

in morning exercise, where the entire school assembles, they be written in such a way that they would interest the children and give them some idea of the influence of these events on present conditions. The class seemed to consider the Lincoln-Douglas debates and the Emancipation Proclamation the most difficult to treat in this way. There was a great diversity of opinion. I believed that the story of the Emancipation Proclamation could be told so that it would not only interest, but thrill the children of the third grade, where I was working. I decided to try it. From this time on I had the keenest interest and pleasure in it. To tell this story to people who knew all about it did not seem a dangerous excitement; but to tell it to children was a delight and a joy.

The children of the third grade had studied the boyhood of Lincoln and had some realization of the hardships and poverty of his early life. They now listened with interest to incidents of his young manhood and the story of his election to the presidency. Then I told them how the union was formed, and what the constitution is. The school was suggested as an example of a united government, the various rooms representing the states, and the united school, of which Colonel Parker is president, the union. I told about the territories and their government. The work that this grade had done on the westward migration was a great help to them in understanding about the territories.

The story followed the increasing disagreements between the North and South, especially on the subject of slavery, the withdrawal of some of the southern states from the union, and the resulting war. Then came the story of the freeing of the slaves as a war measure to save the union.

In preparation, I read Lowell's essay and Ingersoll's oration on Lincoln; parts of Arnold's *Life of Lincoln*, *The Story of Lincoln for Children*, *Four Great Americans*, and *The True Story of Lincoln*. I read all I could find of Lincoln's own words—the two inaugural addresses, the last public address, the Gettysburg speech, letters to friends, public and private, and the Emancipation Proclamation.

When I thought I was about ready to tell the story, I found that in order to make it simple enough for the children I had to understand better just what the constitution does say on the subject of slavery, and to this end I studied every word of the constitution. Then I concluded that I must have a more definite knowledge of the events of the war in order to see just how the emancipation of the negroes was a war measure. I now read with an awakened interest the events preceding and following the war.

In writing the account of the Emancipation Proclamation for the pedagogic class, I might have concealed my ignorance by the use of terms such as "states," "territories," "constitution," "amendment," "fugitive slaves," "secession," "contraband," "emancipation." But with children there is no refuge behind terms.

All these facts associated with Lincoln I had heard many times before; indeed, so many times that they had lost meaning for me. Coming to them, however, in a new attitude, and for a definite purpose, they were of absorbing interest; Lincoln became to me a living personality.

After the telling of the story to the third grade came the work of preparing something for the general exercises on Lincoln's birthday, adapted to the entire school, grades and pedagogic classes. The following, the result of many writings and rewritings, occupied two minutes on the program,

THE EMANCIPATION PROCLAMATION.

All eyes were now turned toward President Lincoln. The question was: What would he do about these slaves, and about these states which had said they would no longer be a part of the United States? He himself believed it was wrong for one man to be owned by another man. But he believed that the constitution which the states had made, and to which they had all agreed, gave the states the right to decide for themselves whether they would have slaves or not. What he would like to do was one thing, what he believed he had a right to do as president was another. He believed that a state was not out of the union simply because it said that it was out of the union. He believed that the constitution gave no state the right to secede from the union.

People in the different states disagreed so over these questions that there seemed but one way to settle it. Some people would rather make war than have the union; others would rather take war than give up the union. And war it was.

The constitution of the United States makes the president in time of war the commander-in-chief of the army and navy. There are certain things which people have accepted as right and lawful in times of war. They are called war measures. One law of war is that an army may take from the enemy any property which is a help in carrying on the war.

The people in the North said, if the people in the South owned their slaves, then their slaves were property, and were a help to them in carrying on the war against the union.

President Lincoln said that, as commander-in-chief, he had the right, as a war measure, to take their slaves away from them. Many people urged him to do this, and blamed him because he did not do it. Just as many urged him not to do it, and would have blamed him if he had done it. He said to both sides that his object was to save the union and to save it the quickest way, and when he was convinced that freeing the slaves would stop the war and save the union, he would say the word that would make them free.

He thought it over for many months, and then decided what he would do. He sent out word that if in three months there should still be any states in rebellion against the United States, all persons held as slaves in those states should be then, thenceforward, and forever free.

The three months passed. The seceded states were still at war. It was

New Year's day, 1863— the greatest New Year's day the United States had ever seen, for on that day Abraham Lincoln made free nearly four million slaves.

This New Year's notice of freedom is called the Emancipation Proclamation.— *Maud M. Green*, second-year pedagogic class.

PHYSICAL TRAINING.

SCHOOLROOM HYGIENE.

CAROLINE CRAWFORD.

FOLLOWING the structure of the body and the mechanics of its action, studied by the pedagogic students last month, the subjects for March will be:

1. The normal size for age and sex (the January number contains, on p. 370, American tables for height and weight): (*a*) study of the measurements of various parts of the body, and the relation of the different parts to each other; (*b*) laws of growth and development; (*c*) study of individual children in comparison with the normal type; (*d*) effect of systematic exercise upon the child; (*e*) means of testing increase in size and strength; (*f*) effect of modifications in daily dietary of child; (*g*) effect of changes in the physical environment upon the child's development.

2. Application of the laws of growth: (*a*) character and amount of the child's daily activity; (*b*) length of various work periods; (*c*) form of activity for recuperation of the body-force; (*d*) character of the fatigue signs; (*e*) effect of fatigue upon mental activity; upon physical activity.

3. Sight and hearing: (*a*) tests of sight; (*b*) tests of hearing.

4. The physical environment of the child: (*a*) the adjustment of the seat; (*b*) the temperature and ventilation of the room occupied; (*c*) the amount and source of the light in the room; (*d*) the cleanliness of the room; (*e*) the character of the materials used while at work.

SPORTS, GAMES, AND PLAYS.

CARL J. KROH.

RUNNING THE GAUNTLET.

Four to eight boys are formed in a semi-circle, eight or ten feet distant from two rows of boys standing at right angles to the center of the semi-circle. The two rows are four feet apart, the distance between the players in the rows being regulated by the number of players participating in the game. The leader of the game throws a basket-ball upward midway between the semi-circle and the rows, calling out a number of one of the boys in the

semi-circle. The boy representing the number called responds by trying to catch the ball as it descends and before it touches the floor. If he succeeds, he returns to his place, and the leader again calls out a number as he throws the ball up a second time. If the player called fails to catch and hold the ball, he must run the length of the two rows and between them, the respective boys striking him with their handkerchiefs as he passes. The quickest runner receives the least punishment. Having run the gauntlet, he aligns at the end of one of the rows, the boy at the head of such row stepping into the vacant place in the semi-circle.

LADYSMITH.

The class forms a circle around a fort represented by four Indian clubs placed in the form of a square or cross. The guard in the center of the fort maintains his post by protecting it against the shots delivered by the enemy composing the circle. The purpose of the enemy is to displace the clubs with a basket-ball, and to keep the guard as busy as possible replacing them. All clubs down, he surrenders to the last gunner, who rebuilds the fort, whereupon hostilities may again be resumed. The game may be varied by detailing the poorest gunner to assist in holding the fort; or, a stated number of failures to disable the enemy may result in exemption from service, etc.

TOUCH-BALL.

The game consists in quickly passing a light rubber football in such a manner that the player within the circle will find it difficult to touch the same. The players forming the circle may take a prescribed position and pass the ball quickly in any direction within the circle, left or right, high or low, across the circle. An inner group, definitely stationed, may assist the players of the circle. The ball should not be held by any player, quick play being the rule. The player who is after the ball may jump to touch it, the player who last passed it exchanging places with him if he succeeds.

HORNETS' NEST.

The game consists in passing a basket-ball quickly from player to player without prescribed order, the player failing to catch the same running over a prescribed route around the class, or circle, in order to regain his place, the other players in the meantime giving chase and striking him with the ball as often as possible. Or, the unsuccessful player may, in addition to his circuit, be required to assume some difficult posture, or to execute accurately some prescribed exercise in the center of the circle.

SCHOOL GYMNASTICS.

(For reference throughout the year.)

SWINGING-ROPE EXERCISES.

Apparatus, class formation, and starting order.—A rope twenty to thirty feet long, one-half inch in diameter, with one end fastened to a pillar or piece

of apparatus at a proper height from the floor, and grasped at the other end by the teacher (center of rope resting on the floor). The class is formed in a single row in front or in flank in a straight or curved line, on one side and at a distance from the rope. Pupils approach the center of the rope from a "starting-point," upon command.

PASSING (WALKING, RUNNING, OVER AND UNDER THE ROPE); JUMPING, HOPPING, SKIPPING.

Passing.—(Swing rope sideways over a space of about two to four feet.) Pass (walk) over rope forward left (right). (Form on the opposite side in regular order.) Repeat sideward left (right). (Approach and face to step over and away quickly.) Repeat backward. (Approach and face about to step over and away.)

Repeat forward, sideward, etc., turning left (right) about. (Step over and turn about while leaving.)

Repeat exercises in pairs, threes, fours, etc. (to command; in definite successive order.)

Repeat exercises from both sides simultaneously (class formed in divided order, on both sides of rope).

Repeat, increasing length of rope-swings; ditto, height; ditto, length and height.

Repeat, running.

Jumping.—Repeat above exercises with walking and running starts, jumping (with both feet simultaneously) from given starting-points.

Repeat, hopping two or more times over rope before leaving.

Repeat, adding arm and leg exercises; ditto, facings.

Repeat exercises as above, sideward and backward, in pairs, etc., from both sides of the rope, increasing length and height of swing.

Hopping.—Repeat above exercises, hopping on one foot left, right, and on both alternately, one or more times, leaving to form on the opposite or same side.

Skipping (see October number).—Skip forward left (right); sideward and backward left and right; forward left to face right about, and right to face left about, leaving backward. Sideward, backward, same.

Combine above exercises, skipping and hopping, or jumping.

Circle-swinging (from starting lines).—(Circle right with class on the right ride of the rope; left, with class formed on the left side of the rope.

Pass under rope, singly, in pairs, etc., to full class. Same, turning about, etc., to form on opposite sides; walking, running.

Circle-swinging (toward starting lines).—(Circle left with class on the right side of the rope, pupils skipping, hopping, or jumping over rope, as directed.)

Pass over the rope to opposite side; ditto, hopping on place, repeating rope jump one or more times; ditto, hopping or jumping till next pupil enters;

ditto, hopping or jumping with quarter and about facings; ditto, two or more pupils at a time; leave toward opposite, or same, sides.

Combine jumping over and passing under rope.

BALANCE PLANKS.

Four to eight balancing boards (see manufacturers' catalogues) placed next each other. Class: eight to twelve ranks, as many pupils to each rank as boards. Exercises are executed in "linked order" or otherwise, in close order at half or full distance. "In linked order," pupils grasp hands with arms bent or extended, or arms crossed with hands grasped over and under next pupil's arm, front or rear; with one or both hands on next shoulders, etc. Starting positions are taken by placing the left or right foot on the beam ends.

March forward with foot and leg extensions (slow rhythm—erect, head and chest up); "skip" off plank end. (Form opposite class, facing about.)

Same, gliding forward (bending stand-leg to each step; swinging legs forward along sides of planks; describing semi-circle.

Same, backward.

Galop-step, forward, left, right, and alternately.

Same, backward.

Change-step forward (marching), including leg exercises, first movement.

Same, hopping (schottische steps).

(The whole class may stand on the planks to execute leg exercises, etc., as "balance exercises." The planks may also be used for stem-support exercises, several ranks exercising at a time.)

PHYSICAL TRAINING IN THE FRANCIS W. PARKER SCHOOL.

FRANCES MUSSELMAN.

To enhance the value of exercise and to maintain the proper balance between the mental and the physical activities of the children, we have set apart a regular period each day for outdoor games and sports in addition to systematic indoor gymnastic training. We go out regularly, stormy days alone excepted. Even zero weather is no hindrance, the children being properly clad to resist the cold.

The children of the first, second, and third grades, with a teacher appointed for the day, form one group that goes out daily from eleven to half past eleven. A half-hour is considered long enough for the younger children, especially as their school day ends at one o'clock. The grades from the fourth upward have their period from a quarter before three to a quarter past four. The girls of these grades, with a teacher to supervise the games, form one group; the boys, with another teacher, form a second group. These groups are sometimes subdivided into squads or teams, each with a captain or leader, the squad selecting the game it desires to play. This subdivision into smaller groups enables the teacher to devote more time to children who, for some reason, do not enter into the spirit of play.

With the return of milder weather, we shall introduce tennis, la crosse, running, jumping, and races of different kinds. As the objective point of our sports we hope to have a field day. The children are now making the la crosse sticks in the manual-training room. They are also planning to make apparatus for an outdoor gymnasium, to be set up as soon as the weather permits. Thus practically all our physical training will be done out-of-doors during the spring months.

THE KINDERGARTEN.

(FRANCIS W. PARKER SCHOOL.)

MATE H. TOPPING.

THE following is an attempt to describe how the number element enters, as a necessity, into the work of the kindergarten. It indicates briefly, through examples, that the child himself must feel a demand for definite measuring or numbering before it comes legitimately into his work. In reviewing the work of the kindergarten up to this time, it is evident that, without forcing, almost every phase of the child's work and play has made some demand in this direction. This demand has been recognized in such simple ways as the following:

In considering and representing the furniture of the home, the children decided to make a small bed. The first thing necessary was to find out how many pieces of wood were needed. We first built a bed with the parallelopipeds of the fourth gift, and found it would require five pieces if we made side pieces, otherwise only three.

The children were asked to show how long they wanted their beds. This they did by indicating the desired length on the table. The average length was found to be ten inches. From a piece of board about four inches wide each child counted off ten inches, and a line was drawn to mark the distance. In the manual-training room every child sawed off his piece of board and smoothed the ends with a wood file. This ten-inch piece made the bottom of the bed. The head and foot boards were chosen from among the odds and ends in the manual-training room by proportion, rather than by actual measurement.

To find how long to make the blankets and sheets, we measured the length of the bed and enough to tuck in at the foot and sides.

The children are given many opportunities to work out the thought in their own minds, or the suggestion given them in free play either with the large blocks described last month or with the regular building gifts. They choose without direction the parallelopipeds for height and length, and the

cubes for thickness, as has been done frequently when building barns or cages for their toy animals or in imitation of those seen at the park. In such play they are gradually becoming familiar with the three dimensions.

In dramatizing simple stories, as "Three Bears," or in illustrating our songs with charcoal, paints, or crayon, the sense of proportion is being trained.

There are many occasions when counting and combinations of numbers are a necessity to the fulfilment of the child's purpose. In getting out and putting away material the children often count the pieces used, in order to ascertain that each child has an equal number or that none is lost. To get our building blocks out of or into the boxes in the most economical manner demands piling them in layers of twos and threes, and sometimes combining two or four parts to make a single complete cube. In the frequent repetition of this some skill is unconsciously acquired in grouping numbers.

Thus almost every day the children need to find out some quantity, number, or weight, but without often demanding accurate results; the judgment is cultivated, but formal number work is not required to satisfy the child's need. If we follow the kindergarten spirit, the need and ability of the child, not a preconceived idea or outline, will serve as a guide for the work.

HOW FIDO DELIVERED THE MILK.

ANNE ELIZABETH ALLEN.

THE milk wagon was ready, and Old Bob was standing with it at the door waiting for Mr. Roberts to go his rounds with the milk. Little Fido, the collie who always went with the wagon and rang the large bell, was seated in his place ready to start.

Indoors everyone was not so ready to go. Poor Mr. Roberts was ill and could not get up. What could they do? Would they be obliged to let all that good milk spoil? Suddenly little Paul, who had heard his mother and father talking about their trouble, said: "Why can't Fido take the wagon? He always rings the bell anyhow, and Old Bob knows every stop."

"What an idea!" said his mother; "it is the best we can do, and we'll try it."

Smithville was a little town, and everybody knew everybody else. Mrs. Roberts wrote a note and pinned it on the wagon, caught the reins in the hook in front, and sent the wagon off, telling Fido he would have to take his master's place as she

started Old Bob off toward his first stopping-place. Fido looked very serious as the wagon began to move, but he seemed to understand.

Old Bob stopped first, as usual, at Mrs. Bates'. Fido seized the bell in his teeth and rang until Mrs. Bates came out. How she laughed when she saw Fido sitting in his master's seat. She read the note, drew her milk out of the large can, and left her ticket in the little box nailed in front of the wagon.

Their next stop was at the house of the meanest man in town. When he read the note and saw that Mr. Roberts was not in the wagon, he thought he would just take his milk and not leave his ticket. Fido's sharp eyes were upon him, however, and as the man turned away without putting his ticket into the box, Fido sprang at him, caught him by the leg, and would not let go until the man dropped the ticket where it belonged. "That dog was too smart for me," he said, as he put his pitcher on the kitchen table.

So Old Bob and Fido went their rounds, delivering the milk, and at noon drew up at the post-office, where Mr. Roberts stopped each day before going home.

The postmaster saw the wagon and wondered why Mr. Roberts did not get out.

Fido waited for a while, and then, growing impatient because no one came out, seized the bell in his teeth and rang it. The postmaster ran out to see what was the matter, and stopped to laugh when he saw little Fido sitting alone in the wagon. He read the note, then called the other men in the post-office to see Fido. He read the note aloud this time. It said:

"I am ill, and Fido is making my rounds today. Be good to him. Take your milk and leave your ticket, please.

"JAMES ROBERTS."

"Well, such a dog I never knew," said the postmaster.

"Let us give him a blue ribbon," said another.

"I vote to give him a beautiful collar with his name on it," said another.

The men tied a blue ribbon around Fido's neck, but the ribbon was soon replaced by a fine collar given him by the men at the post-office.

The mail was put into the wagon, and a prouder dog never lived than Fido when his mistress came out to meet him, and, looking into his big brown eyes, said: "You are a good dog, Fido."

Old Bob was not forgotten, either, for his mistress fed him herself that day, giving him the best dinner he had ever had and a dessert of lump sugar.

FIRST GRADE.

ELSIE AMY WYGANT.

MATHEMATICS IN THE FIRST GRADE.

IN the November number of the ELEMENTARY SCHOOL TEACHER Mr. George W. Myers gives a tentative outline of work for each grade in the School of Education. Mr. Myers emphasizes the fact that this was presented, not at all as a hard and fast course in mathematics, but as a suggestive outline and an analysis of the abstract number which grows out of such use of number as is needed for clear imaging in history, geography, science, manual training, and cooking.

Mr. Myers states the "abstract outcome of the number work of the first year" as:

(1) The whole numbers and their notation up to 12 or 15. (2) The meaning of +, read "and" at first, later "plus;" −, read at first "less" or "taken from," later "minus;" ×, read "times" or "multiplied by;" ÷, read at first "is how many times," later "divided by;" and =, read at first "are," later "equals." (3) All the fundamental addition facts, such as $2 + 3 = 5$, $4 + 5 = 9$, etc., using sums not exceeding 12 or 15. (4) All the correlative subtraction facts, such as $5 - 2 = 3$, $5 - 3 = 2$, $9 - 4 = 5$, $9 - 5 = 4$; etc. (5) Halves, thirds, fourths, and fifths of numbers up to about fifteen, and how to write and read them. (6) Yard, foot, inch, pint, quart, peck, bushel, gallon, cent, nickle, dime, and dollar, and their abbreviations, learned by using the measures.

Not as a criticism of the outline here given, but simply as an expression of how far the experience of this half-year, with this particular group of children, has confirmed the statement, and how far the actual demands for number have modified it, the following results of the practical work are given.

The outcome in mathematical conceptions and power to handle numbers, up to date, at the end of one half-year, seems to be:

(1) Notation and relation of numbers up to 12.

(2) Notation to 100 by ones or twos.

(3) Use of +, read "plus" or "and;" =, read "are."

(4) Addition of numbers whose sum does not exceed 12, and correlative subtraction (not at present automatic, but rapidly becoming so).

(5) ½, ⅓, ¼, and ⅛ of one thing; ½ and ¼ of 12; ½ of 10; ½ of 20: ½ of ½, ½ of ¼, ½ of ¾ (not automatic, but understood sufficiently to be used by the children in independent work); ½ of ½ (automatic); ¼ + ¼ + ¼; ½ + ¼; ¼ + ⅛.

(6) Units: inch, foot, gram, gill, pint, cubic inch, Fahrenheit degree.

(7) Geometric forms: circle, square, oblong (rectangle), cube, sphere, brick.

Judging from past experience of this year and from the present plan of work, the children will fail to know the following items included in the quoted outline:

There has been no occasion when either the words or the symbols × and ÷ could have been used with any economy either in directness of speech or accuracy of thought.

No work has required the use of 15, certainly not repeatedly enough to familiarize the children with it or its parts.

There seems to be no occasion within the present choice of subjects for the units of measure "peck" and "bushel," and the teaching of these terms will wait upon the necessity.

Among the things likely to be required in the second half of the year, but not suggested in the outline, are:

1. Writing of numbers to 80 (limited to 80 as the probable highest temperature to be recorded).

2. ⅓ and ⅛ of 12. ½, ¼, and $\frac{1}{10}$ of $1. (used in keeping accounts).

3. Units: square inch, ounce, and pound, and images of both the number and the appropriate physical sensations of 0°, 32°, 50°, 70°. (These particular degrees are cited because in each case some strongly marked or frequently repeated experience has been associated with that temperature, as 0° means extreme cold; 32°, freezing; etc.)

Only such number work has been taught as was demanded by the work upon which the children were engaged. When a

subject could be made clearer, or when a thing to be made needed a certain use of number, the number demanded by the occasion was taught.

Sometimes doing the thing once was sufficient; the given act, measurement, or relation was available without difficulty when next needed. At other times, once was not enough, and in such cases the drill necessary to give the child a ready use of the fact was undertaken.

For instance, the gill measure had been used more than once in cooking. Last week each child had a cocoanut, the milk of which we were to use for lunch. Each found how much his cocoanut contained, which happened to be about one gill.

When the class attempted to measure, it was evident that the previous uses had not taught the gill nor its relation to one pint. So again the children experimented with the gill and pint measures, and the next lesson was made to continue with the following drill on the liquid measures:

A number of one-gill, two-gill, and pint measures were placed on the table. After finding the capacity of each, we played milkman. This play was twenty minutes of drill—drill largely originated by the children and unreservedly entered into by them.

This game was chosen because, aside from the value of the play itself, it offered an opportunity for the children to buy and sell, to originate problems, and to use the measures, not in an isolated way, but in a natural domestic transaction. The play was spontaneous, being but slightly directed by the suggestions of the teacher, who served as the milkman's assistant.

The following incident shows a child's freedom in the use of number and his play interest in its manipulation:

One of the boys came to the store and asked for three gills of cream. He was told that cream was two cents a gill. He handed out imaginary change. "How much did you want to give me?" was asked by the assistant milkman. "Six cents." "But you gave me a dime." "Keep the change," was the instant reply, "and tomorrow when I buy three gills I will bring only two cents."

Another instance of drill:

When the children made calendars for a valentine, it was necessary to

know how to write the figures to 31. The children saw the necessity of writing them neatly and legibly. With this motive they imposed upon themselves sufficient drill to obtain that skill before the work on the calendar was undertaken.

OUTLINE FOR MARCH AND APRIL.

Geography.— During March and April the work on sources of food will be continued in a study of transportation,with the attention directed chiefly toward railroad transportation.

Visit the Field Museum to see exhibit of primitive and foreign methods of transportation, telling such stories as these suggest.

REFERENCES: Kirkman, "Origin and Diversity of Transportation," Vol. III, chap. 1, and the chapter on "Primitive and Prehistoric Carriers," *Science of the Railways* (K 5775, Chicago Public Library call number).

Visit to yards of Rock Island Railroad, on Forty-seventh street, near Wentworth avenue. Things to be seen on this trip:

(1) Cattle cars, chicken cars, fruit cars, flat cars, box cars, caboose, ready for service and in various stages of construction; (2) casting of wheels; (3) making of parts of an engine; (4) putting the engine together.

Tell stories of heroism of engineers, selected from Cy Warman's "Engineer Stories," *McClure's* 1900–1901; Kipling, ".007," *A Day's Work;* Howell, "Pony Engine," *Christmas Every Day in the Year, and Other Stories.*

Science.—1. Water: Uses to man for drinking, cooking, and cleansing; in running mills, as steam, in transportation. These, and as many other uses of water as possible, the children will be helped to find during our study of this subject, and to record on a large chart as they discover them.

2. Rain: Its formation illustrated by experiments in condensation and evaporation. Percolation through different kinds of soil, as one guide in choosing garden soil.

How to purify water; various experiments for that purpose. The children have already discovered that the sand somewhat purifies water which has drained through it. Continue and show distillation.

REFERENCES: Jackman, *Nature Study for the Grammar Grades;* Howe, *Systematic Nature Study;* Tyndall, *Forms of Water;* King, *The Soil;* any good Meteorology; Rowell, *Cause of Rain* (K 7455, Chicago Public Library number); Jones, *The Water World* (K 7388); Angus Smith, *Air and Rain* (K 7554).

History.—Making floor coverings for the parlor of the playhouse, either a rug or a carpet. Visit: a loom in operation; Assyrian women spinning; South Americans weaving tapestry; display of oriental rugs.

Each child will be given a part of a sheepskin to wash, shear, card, spin, dye, and weave.

The looms are ready for use. (See description of same in ELEMENTARY SCHOOL TEACHER, Vol. II, No. 4, p. 305.)

REFERENCES: Lister, *Manufacturing Processes of Wool and Worsted* (K 13955, Chicago Public Library catalogue); McLaren, *Spinning Wool and Worsted* (K 6058); "Origin and Ancient History of Sheep," *Pastoral Life and Manufacture of the Ancients* (K 6021); Ashenhurst, *Design in Textile Fabrics* (K 6025); Lord, *Decorative and Fancy Textiles* (with designs and illustration) (K 13946).

Number.— Such as is required in the making of a freight car. In connection with geography, after the visit to the Rock Island Railroad yards, each child will make a freight car in woods, casting wheels of lead. This will require both linear and cubic measure.

Science work demands: (1) area of one square foot; (2) volume — 12 cubic inches, seen in various shapes, as $12 \times 12 \times 1$, or $12 \times 6 \times 2$, etc.

Number in history: Plan rug or carpet to fit floor; make design accurately.

Music.— Eleanor Smith, "Spin, Lassie, Spin" and "Rain Coach," *Songs for Little Children*, Part II; Gilchrist, "Rippling, Purling Little Brooklet," in Tomlin's *Children's Songs and How to Sing Them;* Eleanor Smith, "Wind Song;" Reinecke, "Fair Snow White;" Taubert, "The Postilion," "Modern Music" series, Book I; Eleanor Smith, "The Sap has Begun to Flow," *Songs for Little Children*, Part II.

SECOND GRADE.

CLARA ISABELL MITCHELL.

REVIEW OF LESSONS IN ARITHMETIC.

I. *The thermometer.*— Is today colder or warmer than yesterday? How much? How do we measure heat? How does the thermometer measure heat? Who can read what it registers today?

All take thermometers. Find the figure 1 on your thermometer. Find the figure 0. Starting at the bulb where the mercury is, show with your finger how far the mercury rises when there is one degree of heat to measure. Begin at the bulb again and show how high it rises to register 10°, 20°, 30°, 40°.

To what point has it risen today? (Between 30° and 40°.)

How many spaces are there between the marks 30° and 40°? "Five." Draw on the blackboard that part of the thermometer which is between 30° and 40°, divided into five spaces. How many degrees between 30 and 40? "Ten." How many spaces? "Five." Then how many degrees must each space stand for? "Two." Count and see. Count by twos: "Two, four, six, eight, ten." Call the first space 32°, the second 34°; and so on.

Now read the temperature today: "34°." How is the thermometer marked, beginning at 0? "0, 10, 20, 30, 40, 50, 60," and so on, to 220.

You have been counting by tens. This is the way they are written:

10× 2= 20
10× 3= 30
10× 4= 40
10× 5= 50
10× 6= 60
10× 7= 70
10× 8= 80
10× 9= 90
10×10=100

These statements mean: 2 tens are 20; 3 tens are 30; 4 tens are 40; and so on. Read them in that way. Write them in your number books.

How did we count by twos? We will all write the statements for counting by twos and keep them in our books.

Materials used: thermometers; pans of water, heated to different degrees of temperature; ice and snow.

The children guessed at the temperature of each of the pans of ice, snow, and water, and then tested with thermometer. The melting point was found to be about 34° F., and the children were told that 32° F. is regarded as the fixed point on the thermometer for indicating the freezing temperature.

A beaker full of snow was placed over a lighted lamp and tested constantly by feeling and by the thermometer. During the course of the heating the rise of the mercury was recorded in figures all the way from 34° to 214°.

At the end of this experiment each child wrote his report of the week, as: Freezing point is 32° F. Boiling point is 212° F. We keep our house at 70° F.

II. *Lesson in measurements* (used in the making of lemonade).—The lesson opened by the children's reading the following sentences as they were rapidly written upon the blackboard by the teacher:

"I suppose you all know that somebody's birthday is almost here. Shall we have a party? Shall we invite people and give them something to eat and something to drink? You say, 'A birthday cake,' and here is a surprise for you. The eighth-grade children knew we were to have a birthday and have made the cake for us. Yes, the candles are ready, eight of them.

"What shall we have to drink? It must be something that everybody likes, and that we can make. Lemonade? Whom shall we invite to our party? The kindergarten children."

In estimating the quantities of materials required, the children counted and found that there were five second-grade children and thirteen kindergartners, and decided that each should have 1 glass of lemonade, making 18 glasses.

The teacher wrote $13 + 5 = 18$, which the children read: "Thirteen plus five are eighteen."

Allowing 6 glasses for visitors, how much lemonade shall we make? $13 + 5 + 6 = 24$; or, $18 + 6 = 24$.

How many quarts of water do we need?

The children who could not answer were asked to tell what they knew about a quart. They said: "There are 2 pints in 1 quart."

What do you know makes a pint? "Two cups make a pint."

These two statements were written by the teacher and read by the children.

Then, 1 quart will make how many cups or glasses? "Four." How many quarts will be needed to make 24 glasses? Those children who were slow in imaging this problem were told to make marks on the blackboard to represent the 24 glasses. They were then told to mark off the number of glasses which would be filled by 1 quart of water: "Four." Another quart: "Four more;" and so on.

Write "1 quart" over each lot of glasses that could be filled by 1 quart.

How many quarts are needed to make 24 glasses? "Six." How many fours in 24? "Six."

Count by fours to 24.

The table of fours, up to 24, was written on the blackboard by the teacher, and read and memorized by the children.

RULE FOR MAKING ONE GLASS OF LEMONADE.

½ lemon and ⅙ of an orange squeezed and strained.
¼ cup of sugar.
⅛ of a banana cut in thin slices.
2 cherries.

How many lemons will be needed for 24 glasses? "Twelve." How many oranges? "Four." How much sugar? "Six cups." How many bananas? "Three."

Statements written were:

24 halves = 12. 24 quarters = 6.
24 sixths = 4. 24 eighths = 3.

The lemonade must be made in two large bowls. What part of all the material must go into each bowl? "One-half—3 quarts of water; 6 lemons; 2 oranges; 3 cups of sugar; 1½ bananas; 24 cherries."

½ of 6 = 3. ½ of 4 = 2.
½ of 12 = 6. ½ of 6 = 3.
½ of 3 = 1½. ½ of 48 = 24.

OUTLINE FOR MARCH AND APRIL.

The leading activities of the second grade during March and April will be: (1) gardening, (2) modeling, (3) weaving and needle-work.

1. *Gardening.*— Making of hotbed and planting of such seeds as children may choose. Examination of soils. Preparation and planting of flower and vegetable gardens.

2. *Modeling.*— Studies of leaf buds and germinating seeds as records of development.

3. *Sewing* of original designs on blotters and book covers.

The lessons correlated with this handwork will include the

subjects in: (1) nature study, (2) history, (3) geography, (4) literature, (5) music, (6) arithmetic,

1. *Nature study.*—Collection and examination of buds from the oak, maple, willow, elm, ash-leaf maple, cottonwood, birch, hickory, horse-chestnut, and lilac. Modeling, drawing, painting, and writing as record of development. Parallel record of changes in temperature, wind, clouds, rain, snow, and frost. Continued study of soils as begun in October (see October number). Excursions to swamp at Seventy-ninth street, lakeshore, to Purington, and to a truck farm, for study and collection of soils. Planting of seeds in hotbed, window-box, sand-box, and on netting over water; record of changes.

2. *History.*—Methods of agriculture among some primitive peoples: Aztec and Iroquois Indians; Lake-Dwellers of Switzerland. Ancient Egyptian agriculture as pictured on the walls of tombs. Comparison of primitive and modern implements to be seen in Field Museum. Excursion to McCormick Reaper Works.

3. *Geography.*—Stories, pictures, and stereopticon views of the wheat, corn, sugar, and rice fields of America and Cuba; of the rice and tea farms of China; of the wheat fields of Russia; of fruit-growing in the West Indies, South America, California, Florida, East Indies, Hawaii; of the coffee fields of Arabia and Brazil; of agriculture in Egypt. Excursion to botanical garden to see tropical vegetation. Comparison of temperature in the palm gardens with that of our climate. Excursion to South Water street to see variety of fruits and vegetables brought into our city. Methods of transporting foods from sources into Chicago: caravan, wagon, railroad train, steam and sailing freight boats. Principal routes of travel—railroads, lake, and river.

4. *Literature.*—Review of the story of Joseph; "Hiawatha Fasting;" story of "The Sleeping Beauty," as a spring myth; the Montezuma myth; "The Wind" and "Windy Nights," by Stevenson; "The Wind and the Moon," by MacDonald; "The Wind in a Frolic."

5. *Music.*—(See first grade.)

6. *Arithmetic.*—Measuring, weighing, and comparing the constituent elements in 100 grams of each of the different kinds of soil. Adding account of garden expenses. Finding differences in temperatures of climates represented by the foods which come into Chicago. Special emphasis on the subject of subtraction; teaching of the process commonly known as "borrowing." Writing of tables (multiplication, weights, measures) as they are needed. Recording in the "number books" made and kept by each child.

Reading, writing, speech, and drawing and painting will be used as means of study or expression.

1. *Reading.*—Written and printed stories of agricultural life. Stories of

the food-growing industries of other countries. The poems and stories under "Literature." Directions for work.

2. *Oral reading.*—"The Wind," "Windy Nights," "The Wind and the Moon," "The Wind in a Frolic," to be used as drill in oral reading and speech. Dramatization of the story of "The Sleeping Beauty."

3. *Writing.*— Records of observations made in nature-study lessons. Letters to parents or absent children. Stories to read or tell to others. Lists of words necessary to the writing of stories and records.

4. *Drawing and painting.*— Illustration of stories and subjects of all interesting or suggestive lessons. Designs for blotters; designs for covers of the record books. Leaf, bud, twig, and seed forms will be given as subjects for the designs.

THIRD GRADE.

GUDRUN THORNE-THOMSEN.

REVIEW FOR JANUARY.

French (Lorley A. Ashléman).—The books containing the illustrated "Ronds et Chansons" arrived from Paris in January. The class was given "Sur le pont d'Avignon" for oral reading. The children were delighted to find that they could both read and understand a whole French book.

The greater part of the French work for January centered around the luncheon period. While serving, the pupils spoke only French. This gave rise to the use of the following sentences, which were written several times on the blackboard for the children and then written by the children themselves when sent to the board by each other:

Le quatrième grade est servi.
Voulez-vous une tasse de lait?
Voulez-vous une tasse de soupe?
Voulez-vous une tasse de potage aux tomates?
Voulez-vous une tasse de potage au purée de pommes de terre?
Voilà!
Je vous remercie.
Il n'y a pas de quoi.
Donnez-moi du sucre, s'il vous plaît.
Passez-moi un verre d'eau.
Passez-moi une cuiller.
Qu'est-ce que c'est que ça, mademoiselle? (here the child held up the article in question).

Le pain, le biscuit, le gâteau, le petit gâteau, la tartine, la tarte, la confiture, la gelée, le beurre, le pâté, la pomme, la poire, la banane, la figue, l'orange, les noix, l'abricot, l'olive, le cornichon, la viande froide, le jambon.

A game was played as follows: A person was sent from the room. Each child thought of something he had eaten or touched during the luncheon. The person sent out was called in and asked to guess what article the different children had in mind. Three questions were allowed for every guess, the child answering only "Oui, madame," or "Non, madame."

Est-ce fait de farine?
Est-ce un solide?
Est-ce un fluide?
Est-ce que c'est un fruit?
Est-ce rond?
Est-ce carré?
Est-ce bon à manger?
Est-ce épais?
Est-ce mince? Est-ce acide?
Est-ce doux? Est-ce que c'est amer?
Est-ce que c'est petit? grand?
Est-ce qu'il y a des tomates dedans?
Est-ce qu'il y a du chocolat dedans?
Est-ce un fruit sec?
Est-ce un fruit long?
Est-ce un fruit rond?

For a Monday song, the third grade acted, wrote, and memorized the *chanson* "Faisons la lessive." The class was first told how washing is done in the south of France. Nice was spoken of, and the beautiful Mediterranean. Suiting the action to the word, the children were asked to guess what is meant by: "Les enfants sont sales. A quoi bon la morale? Voici des jupons, des corsages. Les battoirs sont bons," etc.

The song was written on the board. Each thought was acted out again, and different children were asked to point out the words representing the thought imaged.

The following day, after the children had written the date on their papers in French, the sentences were again written upon the blackboard, one at a time, erased, and written on paper by the children. With very few exceptions, every sentence was correctly reproduced.

One child asked why *sales* ("dirty") is written with an *s*. This question gave rise to a lesson on adjectives. Another wanted to know why *le pain* and not *la pain* was written, because she had said *la pomme*. The answer to this question was a lesson in articles and gender. Again, the question was asked why *ai* was "have" and *avez* also "have," thus demanding the needed lesson in grammar.

As the song is to be sung in morning exercises for the whole school, the children have translated it. The translation is to be read at that time for the benefit of those not studying French.

OUTLINE FOR MARCH AND APRIL.

THE spring months will find the children occupied with gardening. The school garden is 160 feet long and 40 feet wide. Each grade will have allotted to it a piece of ground with full responsibility for the planting, sowing, weeding, and harvesting. Although the actual work in the garden will not begin until May, the children must make their plans now and find out what they need to know in order to conduct the work successfully.

The garden must be measured, so that each grade may have an equal area. Drawings must be made which will show the general arrangement of flower and vegetable beds. When the pupils of the third grade have decided which flowers and vegetables to plant, they must find out about the habits and demands of those plants, the condition of the soil, how to prepare it for the proper growth of the seed or plant, how deep to plant, etc.

The means of gaining this knowledge will be: (1) to write for information to the children at Kansas, Ill., who live on farms where wheat, corn, potatoes, etc., are grown; (2) to visit a farm while planting is in process; (3) to read.

When germination takes place out of doors, the children will make a careful study of the plant and animal life on a prairie area selected for the purpose. Each child will make a calendar on a large piece of white bristol board, to keep a record of what goes on on his plot. He will also note in his record, the appearance of the trees, the return of birds and insects, any sign of the reawakening of spring.

The daily weather observations, particularly of the temperature and rainfall, will now be used to build up the picture of cause and effect, the increase of heat explaining the changes taking place.

For suggestions on work in germination and the preparation of boxes in which to plant the seeds, see Jackman's *Nature Study*, pp. 312–15.

"How does the water get into the fruits to make the juice?" was one of the questions left over from our past study. Several experiments may be performed to show how water is absorbed by a plant, for instance:

1. Allow a small plant to grow in a bottle of colored water. (The water may be colored with eosine.) In a short time the red color will be spread all over the stem and leaves of the plant.

2. How much moisture does a plant use in a certain length of time?

Let a sturdy plant grow in a bottle filled with good soil moistened. Cork the bottle tightly, allowing the plant to come through a small hole in the cork. The space around the stem must then be sealed up. Weigh the whole thing. After a number of days weigh again.

In order to understand the value of soils in relation to plant life, it will be necessary to perform some experiments which will show some of the physical

properties of soils. The following directions are taken from Jackmans' *Nature Study*, p. 436:

"1. To find the rate at which the soils allow water to pass through them, take several glass tubes, about half an inch in diameter and a foot long, and tie over one end a piece of linen. Fill each one with a different specimen of soil which has been finely powdered and well dried. Set the tubes upright in a vessel having about an inch of water in it, and note the rate at which the water rises in the different tubes. Keep the water at a constant level in the pan by occasional additions.

"2. To illustrate the different capacities for water: Fold two filters and place them loosely, one inside the other, in a funnel. Carefully dry and place on the filter an ounce of finely powdered soil. Add to this cold water by drops until it begins to trickle down the funnel tube. Continue to add until sure that the soil is perfectly saturated, and then remove the filters to a piece of blotting paper or a cloth which will absorb the moisture from them. Then place the under filter in one scale pan, and the other one, with the soil upon it, upon the other and balance with weights. How much heavier is it now than the dry soil? What part of it is water?"

As soon as the first spring flowers appear, an excursion will be taken to the woods. A sugar maple will have been selected previous to this occasion, and one tapping will have taken place in March. On the excursion the tree will be tapped again. The flowing of the sap will help the children to realize the work of the tree at this time. Boiling the sap to syrup and sugar will follow this observation.

The history and geography work will center around the occupations on the farms of our country at this time of the year. The work and life on a wheat farm compared with that on a rice or cotton plantation. Why a certain crop is raised in one part of our country, and an entirely different one in another part. A continuation of the study of transportation by land and water.

The story of Ulysses in the land of the Phæcians will be dramatized. Greek armor will be made, and bas-reliefs of Greek stories modeled in clay.

French (Lorley A. Ashléman).—La tulipe, sous le nom de tulipan ou turban, coiffe le front des Turcs, qui l'adorent.

The third grade will give "La Fête des Tulipes," which the Turks celebrate in the first days of spring. It will be especially fitting, as the children have planted almost a thousand tulip bulbs in the school garden, and they will give this fête in honor of the blossoming.

The sultan has invited the children of the French missionaries to this fête. They present him a tricolor flag, made of blue forget-me-nots and white-and-red tulips. The sultan, as he thanks them, smiles and says: "You would transform our emblem of love into an emblem of freedom. In Turkey this means imprisonment; but sing to me, and your song may be the key to your prison."

LA FÊTE DES TULIPES.

(La fête se passe au centre du sérail du grand seigneur. On y voit le pavillon du sultan. Plusieurs échafauds sont dressés. Des gradins sont placés en amphithéâtre. Ils sont couverts de riches tapis. Les tapis sont chargés d'un nombre de vases de cristal, qui contiennent des tulipes d'or, de pourpre, de lilas de rouge etc. La salle est illuminée de bougies, et de lampions de couleur. Des oiseaux renfermés dans des cages d'or confondent leurs chansons avec les accords des instruments, que touchent d'invisibles musiciens. Le sultan est nonchalamment étendu sur des coussins. Les seigneurs de la cour paraissent. Ils étalent des présents aux pieds du sultan.)

Le sultan (regardant autour de lui). La fête est belle. (Il étend la main et prend plusieurs tulipes.) Quelle tige élégante! Ce beau vase qui la couronne! Jamais le Turc ne pourra se lasser d'admirer ces riches pétales d'or, d'argent, de pourpre, de lilas, de violet, de rouge foncé, de rose tendre, de jaune, de brun, de blanc.

Les seigneurs. Vive notre emblème d'amour!

Le sultan (s'adressant à un serviteur). Faites entrer les étrangers. (Se tournant vers les seigneurs.) Qu'ils voient cette réunion de fraîcheur, de grâce, de délicatesse, cette variété, cette beauté d'ensemble. Ah! au retour de leur voyage, en voyant une tulipe, ils s'écriront: La Turquie, la belle Turquie!

(Les enfants entrent; ils sont comme éblouis de toute cette magnificence. Ils déposent l'étendard français, fait de myosotis et de tulipes, aux pieds du sultan.)

Le sultan. Je vous remercie, petits français! (Souriant.) Il faut donc que notre emblème d'amour se transforme en tricolor? Eh bien, votre chanson sera la clef de votre prison!

(Les enfants se mettent à chanter.)

LES HIRONDELLES.

Le printemps sourit à la terre,
Le ciel plus pur, avec ses pleurs,
Répand des torrents de lumière;
Et la plaine, triste naguère,
Semble une corbeille de fleurs.

Déjà, sur la branche fleurie,
L'oiseau porte des fils soyeux
Et des brins de mousse flétrie
Pour dresser sa tente chérie,
D'où s'élancent des cris joyeux.

Vous seules, ô mes hirondelles,
N'êtes pas encore de retour.
Ne me seriez-vous plus fidèles?
Pourtant les sources sont si belles
Et si radieux est le jour!

FOURTH GRADE.

GERTRUDE VAN HOESEN.

OUTLINE FOR MARCH AND APRIL.

History.— During January and February the children studied transportation in Chicago: (1) the present system; (2) development since the days of Marquette; (3) comparison with transportation in foreign cities, present and past. In March they will take up the development of the telegraph, telephone, cable, and the mail and district-messenger service, as related to transportation. During the spring quarter the class will study some of the functions of municipal government (see Miss Rice's outline on "Local History," Topic III, "Care that We Take of the People in Our City," ELEMENTARY SCHOOL TEACHER, November number, Vol. II, p. 199). In April we shall consider the water supply and fire, police, and sanitary protection as set forth by Miss Rice.

Nature study.— As a result of the work in manual training and of the excursion to the Pullman car shops, the children have become greatly interested in different kinds of wood and the uses to which they are put. During March they will study wood from the standpoint of utility.

1. Observation of furniture and woodwork in rooms.

2. Choice of material? Influenced by what?

Experiment to discover the qualities of wood: strength, hardness, possibility of polish, and porosity. (*a*) Strength: Prepare pieces of all the ordinary woods, $14 \times \frac{1}{4} \times \frac{1}{4}$ inches. Mark the middle of each piece. Rest its ends on a stable support and attach weights to the middle. How many pounds are required to break the different woods? These tests will be followed by a visit to the Field Museum, where there are large specimens of the same woods showing the results of similar tests. (*b*) Hardness and polish: The children will prepare specimens of the different kinds of wood and polish them as well as they can. At piano and furniture factories they will see how a high polish is obtained. The preparation of these specimens will necessitate a study of the natural grain. A comparison of sections of logs, cut in different ways, will follow; that is, sections showing cross and vertical cuts, the latter both radial and tangential. Again examine furniture and woodwork in room. Is it possible to tell from the grain how the log was cut? Reasons for veneered furniture. (*c*) Porosity: Weigh specimens, equal in quantity, of all the kinds of wood and place them over night in a definite amount of water. Reweigh. What are the reasons for painting, varnishing or waxing woods?

3. Lumbering: By means of pictures, stereopticon views, and reading, the children will be led to understand the preparation of wood before it is delivered at the factories. If possible, they will visit a saw-mill.

4. Market value of the different woods. Upon what does it depend? How is wood bought and sold for manufacture? for fuel?

5. Other products of trees. (*a*) Maple sugar: The children will tap a tree, collect sap, weigh and measure the sap, and then boil it down. By means of pictures, stories, and reading they will realize to some extent the life in a maple-sugar camp. (*b*) From the experience of the class with maple sugar, consider the manufacture, from the sap, of India rubber, turpentine, tar, resin, other gums, and gutta-percha. Consider likewise the following materials, made from other parts of the tree: natural dyes, quinine, cork.

Geography.— In correlation with the work on woods we will study forests, as outlined by Miss Baber in the January number, p. 350.

Number.— The growth of trees: In studying the different woods the children will observe the yearly additions to the trunks of the trees. In order to understand the growth at the ends of the twigs, they will each examine a twig taken from the south side of an oak tree. By looking back from the tip end to the first cluster of rings, they will be able to measure last year's growth. An average of the twigs measured by the entire class will give an approximate idea of the growth of the oak on the south side. They will measure and find the average growth of all the common trees — pine, elm, box-elder, maple, oak, ash, willow, etc.

Is there a difference in the growth on the different sides of the tree? In the growth of a tree standing alone or in a clump?

NOTE.— In the February number, under "Fourth Grade," p. 462, l. 13, occurs the statement: "The result varied *453.6* grams from the standard table." This should have read: "The result varied *.58* grams from the standard table."

Home economics.— The care of wood: How to remove spots or blemishes from woods, whether varnished, polished, or unfinished.

Manual training.— Making of window boxes, in which to sow garden seeds.

UNE APRÈS-MIDI DE CONGÉ.

(Une bibliothèque dans la maison de M^me^ Lasnier, boulevard St. Michel, Paris. Porte à gauche, porte au fond, table, fauteuils, chaises. Le feu brûle dans la cheminée. Estelle Lasnier a demi-endormie dans le fauteuil. Des éclats de rire retentissent dans le corridor. Fanchette, Jean, Marguérite, Louis, Julien se précipitent dans la chambre.)

Estelle (vivement). Qu'y a-t-il?

(Julien s'avance vers le fauteuil avec une gaîté provoquante.)

Julien. Estelle, Jean prétend qu'il gagnera la partie. (Se tournant vers Jean avec gravité.) Jean, mon ami, qui compte sans son hôte compte deux fois.

Estelle. Quelle partie?

Marguérite. Nous allons au Luxembourg (s'approchant du fauteuil) jouer au jeu de paume.

Estelle (appuie la tête sur la main, et d'une petite voix plaintive). Si

seulement je pouvais être des vôtres. Que je suis lasse de la maison. Le docteur dit que je ne puis sortir avant dimanche.

Louis (la regardant avec un air de bonté). Il est vrai, petite sœur; tu dois être bien ennuyée de la maison. Mais, tu as toujours mauvais mine. (Se tournant vers ses camarades.) Passons l'après-midi ici; nous pouvons faire notre partie jeudi en huit.

Fanchette (souriante). Je suis d'accord.

Marguérite (s'adressant aux garçons). Retirons nos manteaux.

Estelle (gaiement). Que vous êtes bons! (Avec intérêt.) Voulez-vous me dire ce qui s'est passé à l'école ce matin?

Julien (un peu railleur). Tu sais nous avons dramatisé la semaine passée "Le Corbeau et le Renard," "Le Rat de Ville et le Rat des Champs," ainsi que "Le Renard et les Raisins." Eh bien, ce matin nous les avons joués pour messieurs les directeurs.

Fanchette (regardant Julien tranquillement). Mademoiselle Convert a dit que nous avions fort bien réussis.

Marguérite (se levant brusquement). Il me vient une idée.

Louis. Voyons ton idée.

Marguérite. Donnons une représentation à Estelle. (Elle traverse la chambre.) Voici notre scène. Nous pouvons entrer et sortir par cette porte à gauche.

Louis et Fanchette. Bravo; la bonne idée!

Julien. Oui, mais où trouver les costumes?

Jean. Julien (Julien joue toujours le renard), le renard ne s'arrête devant aucune difficulté. Toi, qui as tous les talents, tu peux bien te tirer d'affaire avec ce châle jaune d'Estelle. Le corbeau peut porter ce manteau noir; cette chaise sera notre arbre; la bibliothèque le mur.

Tous les enfants. Bravo, bravo!

Estelle (étendant le bras et prenant une grappe de raisin sur la table). Jean, voici des raisins mûrs apparemment; pend les à la porte de la bibliothèque.

(Jean prend la grappe, tire une ficelle de sa poche et attache les raisins à la bibliothèque.)

Estelle. Je n'y tiens plus!

Jean (avec gravité).

ACTE PREMIER.

La scène se passe dans un bois en Normandie. Mise en scène—imagination. Julien Champlain—Maître Renard; Louis Lasnier—Maître Corbeau; Raconteur—Estelle Lasnier.

Estelle (d'un air étonné). Comment, moi, mais je ne sais ——

Jean. Est-ce que tu peux me refuser? Allons; je ne puis faire deux choses à la fois—diriger (regardant Julien et Louis) ces bêtes et raconter l'histoire en même temps.

Estelle. Eh bien; je ferai de mon mieux.

(Jean frappe trois fois sur le plancher avec sa raquette. Louis est déjà sur la chaise, un petit livre dans sa bouche. Julien, dans un coin, renifle l'air.)

Estelle. " Maître corbeau, sur un arbre perché,
Tenait en son bec un fromage.
Maître renard, par l'odeur alléché,

(Le renard se dirige vers Louis, le salue.)

Lui tint à peu près ce langage:
Julien. ' Hé! bonjour, monsieur du corbeau!
Que vous êtes joli! que vous me semblez beau!
Sans mentir, si votre ramage
Le rapporte à votre plumage,
Vous êtes le phénix des hôtes de ces bois.'
Estelle. A ces mots le corbeau ne se sent pas de joie,
Et, pour montrer sa belle voix,
Il ouvre un large bec, laisse tomber sa proie.
Le renard s'en saisit, et dit:
Julien. ' Mon bon monsieur,
Apprenez que tout flatteur
Vit aux dépens de celui qui l'écoute.
Cette leçon vaut bien un fromage, sans doute.'

(Le renard s'en va gaiement avec le fromage. Le pauvre corbeau pend tristement la tête.)

Estelle. Le corbeau, honteux et confus,
Jura, mais un peu tard, qu'on ne l'y prendrait plus."

M^me^ Lasnier (qui est entrée sans être aperçue). Bravo, bravo!

Jean (avec empressement). Vous arrivez à propos, madame. Veuillez faire partie de notre représentation?

M^me^ Lasnier (souriant). Je te remercie, Jean. Quel animal ai-je l'honneur de représenter?

Jean. Vous verrez toute à l'heure, madame. (Se tournant vers Louis.) Cherche moi un peu de pain et de fromage, s'il te plaît.

ACTE DEUXIÈME.

La première scène se passe dans les bois de Vincennes, que voici (il indique une partie de la chambre). La deuxième scène se passe dans la salle à manger de M^me^ Lasnier, que voici. Personnages: Le rat de ville—Marguérite Champlain; le rat des champs—Fanchette Masset; la dame qui vient interrompre le festin—M^me^ Lasnier.

(Louis paraît avec le pain et le fromage. Jean prend l'assiette et la met sur le tapis, puis il reprend.)

Jean. Louis, c'est toi qui récite cette fois.

(Il frappe trois fois sur le plancher.)

Louis.

" Autrefois le rat de ville
Invita le rat des champs,
D'une façon fort civile,
A des reliefs d'ortolans.

Sur un tapis de Turquie
Le couvert se trouva mis.
Je laisse à penser la vie
Que firent ces deux amis.

A la porte de la salle
Ils entendirent du bruit.
Le rat de ville détale;
Son camarade le suit.

Le bruit cesse, on se retire.
Rats en campagne aussitôt;
Et le citadin de dire:

Marguérite Champlain.

' Achevons tout notre rôt.'

Fanchette Masset.

' C'est assez,'

Louis. dit le rustique;

Fanchette.

' Demain vous viendrez chez moi.
Ce n'est pas que je me pique
De tous vos festins de roi.

Mais rien ne vient m'interrompre;
Je mange tout à loisir.
Adieu donc. Fi du plaisir
Que la crainte peut corrompre!' "

Marguérite s'avance vers Fanchette, la salue et fait semblant de lui parler. Fanchette accepte l'invitation, et toutes les deux se dirigent vers le pain et le fromage.

Elles se mettent gaiement à manger.

Mme Lasnier fait du bruit dans le corridor, elle entre dans la chambre, les rats partent comme des flèches.

Mme Lasnier se retire.

Les rats reviennent.

(La bonne qui est entrée par la porte au fond pendant la dernière représentation s'avance.)

La bonne. Pardon, mais mademoiselle Convert attend au salon. Elle voudrait bien vous voir, mademoiselle Estelle. Puis-je lui dire de monter?

Les enfants (s'écrient avec joie). Certainement, certainement!

NOTE.— In connection with this will be discussed the Luxembourg and its situation in Paris, and also Vincennes and Normandy.

FIFTH GRADE.

REVIEW FOR JANUARY.

HARRIET T. B. ATWOOD.

Nature study and geography.— In their study of animal coverings and the fur-trading industry, the children first enumerated, in writing, the kinds of materials commonly used for clothing, keeping those which are intended mainly for warmth in a list by themselves. The lists were read to the class, and, after some discussion, it was decided that silk, wool, down, fur, and, in some cases, feathers, compose the warmest clothing for man. The children's notions as to why these materials are warmer than others, were crude and often very inaccurate. This question was left open until some experiments, to be devised by the children, could be made.

The next point considered was the matter of the natural coverings of animals, and the children wrote a list of these upon the blackboard. For home work they tried to classify the animals with which they were familiar as to their coverings. The children made many mistakes on the question of whether the different animals have fur alone, or only hair, thick fur with little hair, or *vice versa*. We made a trip to the Field Museum to verify these classifications by a study of the animals. The regions from which the animals came were noted, and data collected with regard to coloration of animals living in different environments. The children also sketched some of the animals.

In considering the matter again, the children saw not only that man has adopted practically all of the warmest animal coverings for his winter clothing, but also that he uses no other materials strictly for warmth.

The class then took up a study of furs and visited Marshall Field's fur department, where pelts of all kinds were shown to the children, and the methods of obtaining and preparing them explained. One of the student teachers went also to a tannery, and described her trip to the class.

The children located the regions where the different animals live, and began the study of the animals in their native environment. Topics were assigned for each child to report on, and some library periods were spent in studying the different animals. The children have asked to read some of Ernest Seton-Thompson's stories in class, although they are familiar with most of them.

The plan suggested by the children during the work is to illustrate the industry of fur-trading with pictures, starting with the animals in their native environments. Brief descriptions of the processes which cannot be illustrated will be written. Maps of North America will be drawn, and on these the homes of the animals and the great fur-trading centers can be located.

The experiments to find out what materials conduct heat most readily will be reviewed when the work is completed.

History.—The Virginia colony. We began the study of Virginia by taking an imaginary trip to that colony from New England. The date chosen was 1732. Pictures and descriptions of the coastal plain helped the children to appreciate the differences between the rivers of this region and those of New England. Differences in the climate, soil conditions, crops, and occupations of the people were noted, and the scattered plantations contrasted with the villages of New England.

We then made a more detailed study of a Virginia plantation, using pictures of the houses, furniture, spinning rooms, negro cabins, tobacco sheds, wharfs, ocean ships, and river boats owned by the rich planters. We noted differences in the manners and customs of these people and those of New England, and then investigated when and why they had come to America. The children read the stories of Raleigh, Goswold, Captain John Smith, Gates, Yeardley, and Nathaniel Bacon. They read also of the bringing of the first slaves to Virginia, and considered the reasons for the rapid spread of slavery in the South. They investigated the subject of tobacco-raising, reading in this connection chap. xii in Carpenter's *North America* and selections from Tarr and McMurry's *North America.*

While studing the occupations and customs of the people, the children made a special study of the early life of George Washington. They were given the opportunity to plan the morning exercise for February 22, and they have decided to dramatize a school in the time of Washington as a part of the program.

The children are making tiles to be used around a fireplace in the new school building. They are to be made in low relief, and will represent typical scenes in colonial times. A careful sketch of each scene was made on paper before the modeling was attempted.

REVIEW FOR JANUARY.

FRANCIS W. PARKER SCHOOL.

WILLARD STREETER BASS.

History.—We first recalled the stories of the founding of the various colonies, studied last quarter, and noticed that the most common unit of colonization was the church congregation, and that very frequently the religious convictions of a pastor and his people made them not only anxious to escape domination in England, but also unwilling to endure restraint even from their own brethren in America. The pupils found in this fact the chief reason for the existence of sixteen separate towns in Massachusetts as early as 1634. They saw that for many reasons these towns would wish to govern themselves. First, the strong desire of the people for religious freedom was of

necessity accompanied by a desire for a similar political freedom; second, the people had always exercised a share in the government of the town or parish in which they lived; third, the distance by which they were separated from Boston, and the difficulties of communication, made government from the capital city slow and unsatisfactory. Local self-government was the natural outcome of these circumstances, and the class studied, with some care, the town meeting: who could attend it and vote in it, what powers it had, what officers it chose to carry out its orders, and the questions which it considered.

The industrial life of the New England farm was studied by a careful reading of "Jonathan Dawson," in Jane Andrews's *Ten Boys.*

The class then began the study of Virginia. The love of adventure was a leading motive in founding this colony, and the typical Virginian colonist was studied in the person of that peerless adventurer, Captain John Smith.

Literature.—The class studied Longfellow's *Courtship of Miles Standish.* The most of the poem was first read aloud by the teacher, and then the parts which were best liked by the pupils were read by them. In some of the easier parts the first reading was done by the pupils.

Clay-modeling.—The class modeled plaques in low relief illustrative of scenes in New England colonial life. Nearly all the children chose a scene from the *Courtship of Miles Standish.*

Geography.—In connection with the work in history the class studied characteristic Virginia landscapes from stereopticon and other pictures, and made blackboard drawings of such scenes. It also studied the topography of the south Atlantic states from a sand-modeled map made by the teacher; located the typical landscapes upon it; and finally each pupil modeled such a map.

Our industrial geography in January was the study of coal. By means of stereopticon pictures and reading from Carpenter's *North America,* the class studied the localities in which coal is found and the methods of mining it. When we began to study the distribution of the coal fields of North America, it became apparent that the pupils needed a more definite image of North America as a whole before they could intelligently read a map or understand the commercial significance of coal in a certain location. We therefore spent some time in studying pictures of typical landscapes in various parts of North America, drawing such scenes upon the board, modeling the continent, and making relief maps upon paper (see Ida C. Heffron, *Chalk Modeling*), and locating the various landscapes upon them.

Nature study.—A study of coal: We first discussed the formation of coal. The following reasons were given for thinking that coal is formed by the gradual decomposition of wood: (1) coal is like wood in that it will burn; (2) charcoal, which closely resembles mineral coal, is obtained from wood; (3) some pieces of coal show the grain of wood; (4) vegetable matter

decaying under water forms a combustible peat at the present time; (5) this peat, with pressure, might become as hard as coal.

The class then undertook a rough analysis of coal in the laboratory. Each pupil was supplied with a common clay pipe, about two feet of rubber tubing, a quart Mason jar, a water tank with a shelf on which the jar could stand, a stand to support the pipe, and a Bunsen burner.

After the experiment, each pupil wrote a description of the way in which he performed it and the results which he observed. The following paper, selected from these descriptions, is printed to show, not only the method of procedure, but also the training which this work gives the pupils in clear thinking and accurate expression. Only three corrections have been made from the first copy of the pupil.

ANALYSIS OF COAL.

We took some soft coal, just enough to fill an ordinary clay pipe, which was five grams, and put it in a clay pipe. Next we covered the top of the pipe with plaster of Paris. While this was hardening, we filled a glass jar with water. The jar we put into a large pan of water. Now, this pan had from one side to the other a strip of iron about two inches wide. This strip was in the middle of the pan, not across the top. In the strip were three holes, and after the jar was filled with water we set it bottom-side-up on the strip over one of the holes. By this time the plaster had hardened, and we attached a rubber tube to the other end of the pipe. The end of the rubber tube we put into the jar through one of the holes of the shelf. Now, the pipe with the tube on one end of it was screwed into a clamp which held it firmly over a gas flame. The flame heated the bowl of the pipe into which we had put the coal. If any gas wanted to get out, the only possible way was up the tube into the jar. This it did, and as we watched the rubber tube we saw bubbles come out, and gradually the gas took the place of the water. The gas was yellow.

After that, we took the coke out and weighed it. Mine weighed 2.4 grams. The gas was about one-half the weight of the coal.—*Margaret Prussing.*

At the next exercise we noticed the thick black fluid found in our pipe stems and rubber tubing, and the brownish-yellow film on the sides of the jars containing the gas, and on top of the water in them. We called this coal tar. We then examined the gas in our jars and found that it smelled much like the gas supplied to the building from the street, and that it burned in the same way in an ordinary and a Bunsen burner. This naturally raised the question: "Is the gas supplied to the building made in the same way as we made this?"

The answer to this question was postponed until we had burned the coke which we made in the first experiment and weighed the ashes. The burning was done in the same pipes in which the coke had been made, the tops of the pipes being now open.

An excursion was then taken to a gas plant which supplies a large part of the gas used on the North Side. While there, we saw a large plant

for making gas from coal by essentially the same process which we had employed in the laboratory. This plant had been abandoned and a method involving much less labor substituted for it. After the trip each member wrote a description of some particular part of the process, and the best descriptions were selected and combined by the class into a single article. The teacher of course assisted in this work, but made no changes in which the class did not concur.

THE MAKING OF WATER GAS.

(Written by the pupils of the fifth grade.)

Water gas is made from coke and steam. The coke comes from West Virginia. It is made by heating coal and driving the gas out. When they get the coke at the gas works, they put it into wagons, which hold about half a ton. There are big furnaces into which they put the coke. They draw the wagons up to the top of the furnace and let down one side of the wagon, so that the coke can fall into the furnace. Then they light the coke with a torch and force in air so that the coke will burn to a white heat.

When the coke in the furnace is white-hot, they turn off the air and turn on the steam. The steam is made in a boiler and then is heated still hotter. The steam going through the hot coke makes two kinds of gas. These gases will give heat, but no light.

In order to make the gas illuminating it has to go into a carburetor. The carburetor is a chamber with arches running across it. There is a pipe in the top where oil is let in. This runs over the arches. Then the gas is let in. The oil and the gas combine and make illuminating gas.

The gas then goes into a fixer. The fixer is a chamber similar to the carburetor, but it is larger and contains no arches, but white-hot fire brick instead. The gas is here made more permanent and will not change during the rest of the process.

After the gas comes out of the fixer, it goes into a tar extractor. This takes out the tar. It is made up of a tank of water. The gas bubbles through the water and the tar goes to the bottom of the tank.

Then the gas goes through a pipe into a cooler. The cooler is a box with pipes in it. The pipes are filled with cold water. The gas goes between the pipes, and when it comes out its temperature is about 60°.

It has sulphur in it now. If they left the sulphur in, it would bleach all the plants in the room where it was burning and make the air unhealthy to breathe, In order to get the sulphur out the gas has to go through a purifier. The purifier is a box with a layer of sawdust in the bottom to take out the remaining tar. On the top of this is a layer of iron oxide, which takes out the sulphur. Now the gas passes through a meter, which measures how much has been made, and into a storage tank.

When the coke is burned the men take an iron bar about twenty feet long. With this they clean out the furnace and knock the cinders off the sides. Then they have a door under the furnace where they take the ashes out.

The cinders contain a great deal of carbon, and poor people come and get them and use them for fuel.

Number.— The class ascertained the price per ton of coal used in the school building, and the quantity used per month, and from these data computed the average cost of heating the building for a day. Some drill problems upon the weight used in selling coal were given at this point.

The class tabulated the results of the analysis of coal in the following form, which is printed in full to show the nature of the number work involved and the accuracy with which the work was done.

The blanks in the table were caused by the pupil losing either his coke before it was burned or a portion of his ashes before they were weighed. In forming judgments of the accuracy of this work, it should be remembered that this is the first these children have done with such a small quantity of material.

ANALYSIS OF SOFT COAL.

Pupils.	Weights in Grams.					Per Cents.		
	Coal.	Coke.	Gas.	Ashes.	Carbon.	Gas.	Carbon.	Ashes.
J. L.	5	3.3	1.7	.6	2.7	34%	54%	12%
M. P.	5	2.4	2.6	.5	1.9	52	38	10
E. D.	5	3.	2.	.5	2.5	40	50	10
C. H.	5	3.	2.	..	...	40	..	..
L. D.	5	2.8	2.2	.4	2.4	44	48	8
D. A.	5	3.	2.	..	...	40	..	..
N. P.	5	3.	2.	..	...	40	..	..
A. H.	5	2.1	2.9	..	...	58	..	..
E. B.	5	3.	2.	.7	2.3	40	46	14

As this was almost the first serious work which the pupils had done in percentage, and they had not an easy mastery of decimal fractions, the following method was adopted in obtaining the per cents.:

E. D. obtained 2 grams of gas from 5 grams of coal, *i. e.*, $\frac{2}{5}$ (2 fifths) of her coal was gas. $\frac{1}{5} = \frac{20}{100} = 20$ per cent., and $\frac{2}{5} = 2 \times 20$ per cent. $= 40$ per cent., and 40 per cent. of her coal was gas.

J. L. obtained 1.7 grams of gas from 5 grams of coal. $\frac{1.7}{5}$ (1.7 fifths) of his coal was gas. $\frac{1}{5} = 20$ per cent., and $\frac{1.7}{5} = 1.7 \times 20$ per cent. $= 34$ per cent., and 34 per cent. of his coal was gas.

After this work, the reduction of the fractions $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{10}$ to per cents. was taken up, for the purpose of enabling the pupil to handle the more difficult fractions that will occur in another analysis, which the class is just beginning, and ultimately to reduce any fraction to a per cent.

English composition.—The reports of the various experiments in the laboratory are made with the primary object of having a clear and accurate record of the work. Every effort is made to have the papers correctly written in the first place; but after the papers have been written they are examined by the teacher, and mistakes are corrected by the pupil. Mistakes made by a considerable number of the pupils are discussed by the whole class, and rules governing such cases are formulated and written down for future use. In the last months several rules for the use of capitals,

and the principles of paragraphing, have come up in the work, and have been treated in this manner.

OUTLINE FOR MARCH.

HARRIET T. B. ATWOOD AND WILLARD STREETER BASS.

History.— Story of the founding of the colonies of New York and Pennsylvania; mention and location of the other thirteen colonies. New York will be studied with more care than any other of these colonies on account of its unique geographical situation, and the marked differences between its Dutch colonists and the English of New England and Virginia.

Character of the Dutch; how influenced by the geography of their country. Read selections from *Hans Brinker* and, if time permits, give an account of the siege of Leyden, which vividly illustrates the character of both people and country.

Henry Hudson; story of his voyage in the "Half Moon" and of his subsequent voyages and tragic fate.

Settlement of New Amsterdam. Hudson's River. Study maps to see its importance as gateway to the West. Was there anything in the Dutch saying that England had secured two shells in Virginia and New England, while they had the oyster between them?

Characteristics of the colony. Compare with the English colonies in regard to trade, schools, and political and religious freedom. For customs of the people read *Rip Van Winkle.*

Pennsylvania: The story of its founding; Penn's treaty with the Indians; growth of the colony; customs and occupations of the people, compared with those of the other colonies studied.

REFERENCES: Fiske, *The Dutch and Quaker Colonies in America; The Discovery of the Hudson River*, "Old South Leaflets," No. 94; Motley, *Rise of the Dutch Republic*, Part IV, chap. II; "Old Dutch Times in New York," *Higginson's History.*

For children: Mary Mapes Dodge, *Hans Brinker;* Irving, *Rip Van Winkle;* selections from *Autobiography of Benjamin Franklin.*

Geography.—1. Study of the geographical conditions influencing the settlement of New York and Pennsylvania. Study of the Hudson as a type of "drowned" river valley. Experiment in laboratory, showing method of formation of such river valleys. Review: Compare the geographical situations of the Thirteen Colonies and the French settlement in America. Consider how the geography influenced the lives of the settlers previous to the French and Indian war.

2. Distribution of industries in North America (continued): (5) Forestry (see also "Nature Study" below). Distribution of forests in North America. Types of forests and their characteristics. Climatic conditions affecting the development of forests. Influence of forests upon a region; effect of reckless cutting down of forests. Proper care of forests. Regions in North America

where lumbering is an important industry. Methods of felling trees and transporting logs. Methods of sawing logs, seasoning lumber, storing lumber.

If possible, trips will be made to a lumber yard, a furniture factory, or the Pullman car works, and to the Field Museum. Pictures and stereopticon views will be used to illustate methods of lumbering.

REFERENCES: Pinchot, *A Primer of Forestry;* "The Value of Our Trees," *Popular Science Monthly*, Vol. XIX; Shaler, *The Story of Our Continent;* Mill, *The Realm of Nature;* "Forests of the California Coast Range," *Harper's*, Vol. LXXIX, pp. 652–60; Tarr and McMurry, *North America;* Adams, *A Commercial Geography.*

Nature study.—1. Study of the landscape: In March the children will mount the paintings made during previous months to form a landscape calendar. Using the weather observations which have been recorded by committees (see October number), they will make their own plan for showing in some graphic way the amount of rainfall and sunshine and the degree of temperature they have noted in the different months.

2. Making of bird calendar to show return of birds: Investigation of the relation between the return of given species and the coming in of new foods; for example, the almost simultaneous reappearance of earthworm and robin.

3. Study of trees: Beginning of growth in stems and buds. Change in color of twigs. Flow of sap. Study composition of sap and productions made from it, *e. g.*, rubber, maple syrup. Tapping of maple tree. Reason for flow of sap; experiment to show root pressure (see Atkinson, *Elementary Botany*, p. 31, and Barnes, *Plant Life*, p. 393). Study of wood and bark. Study of graining and strength of wood (see COURSE OF STUDY, Vol. I, No. 8, p. 745).

REFERENCES: Chapman, *Bird Lore* and *Bird Life;* Neltje Blanchan, *Bird Neighbors;* Herrick, *Home Life of Wild Birds;* Pinchot, *Primer of Forestry;* Tredgold and Tarn, *Carpentry and Joinery;* "Strength of Timber," *Popular Science Monthly*, March, 1873; "Annual Growth," *ibid.*, December, 1883.

Manual training.—Making of a small panel of wood on which to mount a painting made for an Easter gift. In connection with the work in woods, each child will choose the wood for his panel, and will then experiment in the shop to find out the best finish for the given specimen.

Mathematics.—Calculating the strength of different woods from results of experiments. Determining size of logs which can be cut from trees of given dimensions. Study of board measure. Reducing of recipes needed in the cooking classes (see January number, p. 388).

French.—Continue study of French settlement in America. Early in March the children will dramatize the story of "La Salle's Trip down the Mississippi" for morning exercises (see "French" in January number, p. 390).

In addition to the work in history the children will keep a bird calendar in French (see "Nature Study," in this outline).

Oral reading, dramatic art.— Irving's *Rip Van Winkle* will be carefully studied and read by the class.

Music.— Eleanor Smith, "Pussy Willow's Secret," "The Sap Has Begun to Flow; Grieg, "Come out, Snowwhite Lambkin."

Home economics.—Work with cereals continued. Boiling down of maple sap to form maple sugar. The children will tap a maple tree in order to see the flow of sap; but the sap used to make the maple sugar will be sent to the school from a sugar-maple grove in southern Illinois.

Physical training (Carl J. Kroh).— Free exercises in class-rooms under direction of student-teachers; practice hours, mornings. Gymnasium practice order: Boys: boxing — positions, attacks, guards, in place. Repetition of mat exercises in connection with facings. Girls: repetition of dancing calisthenics as "double schottische steps." Apparatus gymnastics: free individual practice, special periods, early morning hours (prescribed) — pole- and rope-climbing, swinging on traveling rings, high- and broad-jumping, traveling on horizontal and inclined ladders. Class work on single and double adjustable bars and beams to improve dexterity, form, and skill. Games: "Ladysmith;" "Running the Gauntlet;" outings to lake front.

SIXTH GRADE.

EDWARD PROKOSCH.

OUTLINE FOR MARCH (GERMAN).

IN connection with the history work of the class, the animal life, botany, and mineralogy of Greece will be studied in German. For this the following reading-matter will be used:

THIERLEBEN, PFLANZEN UND MINERALPRODUKTE VON GRIECHENLAND.

Der Boden Griechenlands ist fruchtbar, aber nur ein Sechstel wurde zu Ackerbau verwendet. Fast drei Viertel des Landes dienten nur als Weide. Die Herden bestanden meist aus Ziegen und Schafen. Nur in manchen Gegenden, besonders in Thessalien, gab es auch viele Pferde und Rinder. In den anderen Gegenden wurde viel Wolle gewonnen. Daher standen die Wollspinnerei und Wollfärberei in hoher Blüte. Die Griechen hatten diese beiden Künste und die Metallgiesserei von den Phönikiern gelernt.

Die Jagd brachte reiche Beute an Wild, und zwar nicht nur Hasen, Rehe, Hirsche, sondern es gab auch Eber, Bären, Wölfe

und Füchse. In der ältesten Zeit kamen sogar manchmal Löwen in Griechenland vor. Daher war die Jagd eine Übungsschule für den Krieg, besonders bei den Spartanern; denn in der Nähe von Sparta gab es viel Wald und Wild.

In den hellenischen Meeren und Buchten gab es ausserordentlich viel Fische.

In manchen Teilen des Landes betrieben die Griechen sehr fleissig Ackerbau. Sogar schlechteren Boden machten sie oft fruchtbar. Sie trockneten z. B. in Boeotien sumpfige Gegenden aus und bewässerten in Argolis dürres Land.

Wein wurde hauptsächlich auf den hellenischen Inseln gebaut, aber auch das Festland hatte schon zur Zeit Homers einigen Weinbau. In Attika gediehen, trotz der Trockenheit, vorzügliche Feigen und Ölbaume; von den letzteren gewann man Oliven und Öl. Der Sage nach hat die Göttin Athene den ersten Ölbaum in Attika gepflanzt.

Am fruchtbarsten waren Lakonien und Euboea, denn die Erde dieser Länder enthält viel Schiefer; dieser zersetzt sich leicht und gibt dann sehr guten Grund für Pflanzenwuchs. Auch Thessalien und Boeotien waren sehr fruchtbar, denn diese Länder waren früher von Seen bedeckt und hatten daher schlammigen Boden. Aber nach den anderen griechischen Staaten wurde viel Getreide aus Thrakien, Makedonien und Kleinasien eingeführt.

Die Mineralschätze des Bodens wurden im Altertum fleissig ausgebeutet. Besonders die Silberbergwerke des Gebirges Laurion in Attika waren sehr berühmt und ergiebig. Auf der Insel Siphnos und in mehreren hellenischen Flüssen wurde Gold gefunden, auf Keos Bleierze, auf zahlreichen Inseln sehr viel Eisen. Im ganzen Westen Griechenlands fand man viel Kalk, aus dem gute Bausteine gemacht wurden. Der Marmor Attikas, Lakoniens und vieler Inseln (namentlich Paros und Naxos) bot das Material für die griechische Bildhauerkunst.

Es gab verschiedene Arten Marmor in Griechenland. Zu Statuen wurde rein weisser Marmor benutzt, den man besonders auf Paros und Naxos und den attischen Gebirgen (z. B. auf dem Berge Pentelikos) fand. Der parische Marmor wurde in unterirdischen Brüchen bei Lampenlicht gewonnen und daher auch

Lampenstein genannt. Der Marmor von den attischen Gebirgen enthielt etwas Eisen; da dieses an der Luft oxydiert (d. h. verrostet), wurde er nach und nach goldbraun. In anderen Gegenden fand man roten, grünen, blauen und fast scharzen Marmor, manchmal geädert, manchmal einfarbig.

FRAGEN.

Was für Herden hatten die Griechen meist?

Was gewannen sie von diesen Herden?

Hatten die Griechen die Wollindustrie selbst erfunden?

Welche Arten Jagdwild gab es in Griechenland?

Welchen Einfluss hatte die Jagd auf das Leben der Griechen, besonders der Spartaner?

Wie zeigte sich der Fleiss der Griechen im Ackerbau?

Wo gab es Wein?

Nenne ein Hauptprodukt von Attika.

Welche Länder waren am fruchtbarsten? Warum?

Woher erhielten die weniger fruchtbaren Teile Griechenlands ihr Getreide?

Nenne einige Mineralprodukte Griechenlands und deren Fundorte.

Warum hiess der parische Marmor Lampenstein?

Wie war der attische Marmor beschaffen?

Welche Marmorarten gab es in Griechenland?

DER DISKUS.

Bei den olympischen Spielen gab es fünf Wettkämpfe: Springen, Wettlaufen, Faustkampf, Ringen und Diskuswerfen.

Der Diskus war eine kreisrunde (seltener längliche) Scheibe aus Stein oder Eisen. Sie war in der Mitte dicker als am Rand, also linsenförmig. Ihr Durchmesser war etwas ein Fuss, das Gewicht vier bis acht Pfund.

Der Diskus wurde auf folgender Weise geworfen: Man drückte die Scheibe mit den zwei vorderen Gliedern des Zeigefingers, Mittelfingers, Goldfingers und kleinen Fingers gegen die Handfläche. Der Daumen war gegen die Kante gerichtet. Dann schwang man den Diskus nach rückwärts, über Kopfhöhe, und schleuderte ihn sogleich wieder mit voller Kraft vorwärts.

Das Diskuswerfen war bei den Griechen so allgemein, dass sie manchmal die Länge einer Strecke nach Diskuswürfen rechneten. Ein "Diskuswurf" als Maass betrug etwa 60 Fuss.

NOTE.—At a morning exercises on the Olympian games, to be conducted by the teacher in gymnastics, the children of the sixth grade will explain in German the discus and the manner of its use.

SEVENTH GRADE.

VIOLA DERATT.

REVIEW FOR FEBRUARY.

History.—The subject of study for the month in history has been the social life of the Middle Ages. The teacher described a territory constituting the estate of a feudal lord, showing by a blackboard map the hills, rivers, forests, and quarries possible on such a domain. Given an estate so valuable, and enemies desirous of seizing upon it by force of arms, how could it best be defended? The children chose the site of the castle. From where were the materials and labor necessary to the building of the castle to be obtained? The answer to this question was first surmised and then confirmed by reading.

A bird's-eye view of a castle was placed upon the blackboard. The children found the strong and the weak points of the castle. The teacher told a story involving the various feudal relations: lord and vassal; the oath; sub-infeudation; the king; the vassal town; the vassal church lands. The scene of the story was, of course, the castle represented on the blackboard. The children read descriptions of social types found on the feudal estate.

The story continued, and developed a plot of conflict between a suzerain and his vassal; the siege which followed brought out the method of manning and provisioning the castle, and the modes and weapons of attack and defense. Each child wrote the last chapter of the story, making it end as he wished.

The children next made sketches of castles and costumes of the twelfth and thirteenth centuries, with a view to composing a picture illustrating mediæval life. This is to be drawn in colored crayon on large sheets of charcoal paper.

The "Siege of Torquilstone," from *Ivanhoe*, has been read in connection with the history.

Bookbinding. — The progress in bookbinding has been rather slow, owing to limited time and the tedious work of mending. The books have been taken apart, cleaned, and mended, and are ready for sewing. Cutting-boards for the work were made in the manual-training period. The children also made their own "bone folders."

Geography.—The children attempted to describe trips which they, or some member of their family, had taken recently. They resorted to railroad maps and guides as a help in recalling the route. In this way the main lines to the eastern and western seaboards were worked out, together with the time taken to go by rail, and the distance in miles. We then considered what materials are shipped from Chicago to the East and West, and the

length of time needed for transportation. We found out our leading exports to, and imports from, China, and the routes of steamers and sailing vessels between our ports and those of the Chinese. In tracing the Suez route, we read what was obtainable on the Suez canal. With these facts as a basis, the children discussed the American canal project, read the newspaper accounts and the two treaties with England, and compared the proposed channels.

Nature study.— A daily record of temperature, wind, cloud, length of daylight, has been kept. Other changes in the weather conditions will be observed and recorded as the children become aware of the presence of these. The past month's work has enabled the children to watch the barometric changes. To bring this about, the following series of experiments was planned:

1. To suggest that air is a substance which must be actually taken into account. Experiments: (*a*) An inverted tumbler pressed downward into a pan of water. What happens? Why? (*b*) Water poured out of a small-necked bottle. How can it be hastened? (Children invented plan of blowing into bottle through a bent tube.) (*c*) Flask weighed, air pumped out, flask weighed again. Result? Why?

2. To show air pressure. Experiments: (*a*) A sheet of rubber drawn over the mouth of a vessel and air pumped out of the vessel. (*b*) A piece of paper pressed upon the top of a tumbler full of water makes it possible to turn the tumbler in all directions without spilling the water. (*c*) A glass bottle half filled with colored water and closed with rubber cork. Two glass tubes through the cork, one closed at the top, the other connected with air pump. Air forced into the bottle; water rises in the tube. Why? (*d*) A flask with rubber cork is half filled with water. A tube through the cork reaches the water. Blowing into the tube causes bubbles to rise to the surface of water. Why? Soon the water spurts from the tube. Why?

The children were asked to give some examples of air pressure in practical use. They mentioned weather-vanes, wind-mills, air-guns, pneumatic tubes, and liquid air.

3. Amount of air pressure. Experiment: A barometer tube filled with mercury inverted and held with open end in a cistern of mercury. What is in the tube above the mercury? Try the weight of a bottle of mercury. How would water act if it were used in place of mercury? Try it. Measure the mercury column. How much air, in weight, will it take to balance this column? How find the amount of air pressure to the square inch?

In the progress of these experiments many questions came up for solution; *e. g.*, if the air supports the column of mercury when the end of the tube is in the cistern of mercury, why will it not do the same when the tube is lifted out of the cistern? This was answered by repeating the experiment of supporting the water in a tumbler by means of a sheet of paper, calling

attention first to the fact that without the paper the water must fall when the glass is inverted.

The following questions were answered by the children in writing: The air extends many miles above the earth; where will the pressure be greater, at the foot of a mountain or at the top? If a barometer be taken to the top of a mountain, what will happen to the mercury column? Can air be put into a flask which is already full of air?

In discussing the last question one child said: "If we should take half the air out of this room, the room would still be full of air." Another said: "The air must be elastic."

The children are now ready to note the daily changes in the barometer and to try to account for them. The teacher explained the method of reading the Standard barometer, and showed its adjustment. The experiments have been accompanied by writing and drawing. Both are very necessary to the clearness of the work, and the conclusion of the teacher is that still more drawing should have been done.

Physical training (Carl J. Kroh), seventh and eighth grades.—Daily classroom exercises, under direction of student teachers. Gymnasium practice: boys—boxing in class order; attacks and guards in position. "Setting-up" drill, United States Naval Academy. Apparatus work: order of optional (individual) work—climbing, vaulting, running. Class work: swing-jumps from flying rings, high standing starts; double horizontal bars: repetition of vaulting forms in connection with facings (see "vaulting exercises"); single horizontal bars: change of position from hang- to stem-support, and *vice versa*. Antagonistics: staff-wrestling; tug-of-war; pushing, pulling. Games: touch-ball; hornets' nest. Outings to lake front. Boys and girls, grammar grades: illustration of month's gymnasium work in morning exercises.

OUTLINE FOR MARCH (GERMAN).

EDWARD PROKOSCH.

DIE NIBELUNGEN.

Als der starke Siegfried, der Sohn des Königs Siegmund von Niederland, herangewachsen war, zog er nach Worms, der Hauptstadt der Burgunder. Er hatte von der Schönheit der Königstochter Kriemhild gehört, die mit ihren Brüdern Gunther, Gernot und Gieselher in Worms lebte, und wollte um sie freien. Niemand kannte ihn als Hagen von Tronje, der tapferste Vasall Gunthers. Er erzählte den Königen, dass Siegfried einst einen Drachen erschlug, sich in dessen Blut badete und seitdem unverwundbar sei. Auch habe Siegfried eine Kappe, durch die er sich unsichtbar machen könne.

Siegfried lebte ein Jahr in Worms und half den Königen in ihren Kämpfen. Dann heirathete er Kriemhild und zog mit ihr nach Hause. Nach zehn Jahren luden Gunther und seine Frau Brunhild sie ein, sie in Worms zu

besuchen. Siegfried und Kriemhild kamen. Aber zwischen den beiden Königinnen erhob sich ein Streit. Kriemhild sagte, ihr Mann sei viel tapferer und stärker als Gunther. Darüber wurde Brunhild so zornig, dass sie von Hagen verlangte, er solle Siegfried töten. Dieser war bereit dazu, denn er hasste Siegfried, weil er ihn um seine Stärke beneidete. Kriemhild hatte nun einen bösen Traum und fürchtete für das Leben ihres Mannes. Sie bat daher Hagen, ihn zu beschützen an der einzigen Stelle, wo er verwundbar war, nämlich zwischen den Schultern; denn als Siegfried in dem Blute des Drachen badete, war ihm ein Lindenblatt dahin gefallen. Hagen versprach es, und damit er die Stelle genau wisse, nähte Kriemhild ein rotes Kreuz auf Siegfrieds Gewand.

Bald danach zogen die Könige mit ihren Vasallen auf eine Jagd. Da schlug Hagen einen Wettlauf nach einer Quelle vor. Siegfried kam zuerst an, aber er wartete, bis Gunther getrunken hatte. Dann bückte er sich zu trinken, aber Hagen stiess seinen Speer durch das Kreuz auf Siegfrieds Gewand in das Herz des Helden, und Siegfried starb.

Die Leiche wurde nach Worms gebracht und vor Kriemhilds Thür gelegt. Sie jammerte laut, als sie den Toten sah und schwor, ihn an Hagen und Gunther zu rächen.

Nach Jahren kam Rüdiger von Bechlarn als Gesandter des Hunnenkönigs Etzel und bat sie, Etzels Weib zu werden. Sie wollte es nicht; aber Rüdiger versprach ihr Rache für alles Leid; da willigte sie ein und zog mit. Nach dreizehn Jahren lud sie ihre Brüder zu einem Fest ein. Die Könige kamen mit Hagen, tausend anderen Vasallen und vielen Knechten. Hagen ahnte, dass sie nicht mehr zurückkommen würden. Aber er fürchtete den Tod nicht.

Am ersten Tag sassen Gunther, Gernot, Giselher, Hagen, Etzel, Kriemhild, Rüdiger und Dietrich von Bern, der Etzels Gast war, beim Festmahle. Da kam plötzlich Hagens Bruder Dankwart blutend in den Saal und rief Hagen zu, dass die Hunnen alle Diener erschlagen hätten.

Hagen springt auf und schlägt dem Kinde Kriemhilds den Kopf ab. Etzel, Kriemhild, Rüdiger und Dietrich verlassen den Saal, und die Hunnen begannen den Kampf gegen die Burgunder. Aber diese blieben Sieger, denn keiner konnte dem grimmen Hagen widerstehen. Die Hunnen zündeten den Saal an, aber die Helden schützten sich mit den Schilden gegen die herabfallenden Brände und blieben am Leben.

Nun verlangte Kriemhild, dass Rüdiger sein Versprechen erfülle. Er war ein Freund der Burgunder und wollte nicht gegen sie kämpfen. Aber er durfte sein Wort nicht brechen und begann den Kampf. Doch auch er wurde erschlagen. Nun wollte Dietrich von Bern ihn rächen. Von den Burgundern waren nur noch Gunther und Hagen am Leben. Dietrich besiegte die beiden Helden und band sie. Kriemhild liess Gunther töten und schlug Hagen mit Siegfrieds Schwert selbst den Kopf ab. Aber

Hildebrand, ein alter Vasall Dietrichs, war darüber so zornig, dass er sein Schwert zog und Kriemhild tötete.

So hatte das Fest mit Leid geendet.

SEVENTH GRADE.

(FRANCIS W. PARKER SCHOOL.)

HENRY T. MORTENSEN.

REVIEW FOR JANUARY.

History.—The children have studied the people of the Middle Ages in their occupations, habits of life, and obvious modes of thinking. As an essential feature of those times, they have studied the monastic system, the life and occupations of the monks, and the feudal castle. Each one, imagining himself a character living in those times, has written autobiographical sketches embodying his ideas of the conditions of life during that age. One child, for example, imagined himself an archer, another a knight. Photographs and stereopticon pictures of the castles and monasteries have helped to give definite imagery.

Literature.—The poem of "Lochinvar" is being read. As there were not enough copies of the poem for each pupil to have one, the children, acting upon their own suggestion, printed copies for themselves. This work has been almost completed, and for a first attempt at "composing" and press-work has been quite successful.

Geography.—As the history brought into prominence the historic places of the United Kingdom, its geography was chosen as the subject of the month. *Longman's Atlas*, wall maps, and Mills's *International Geography* were used in the preparation of the lessons. The children first determined the location of the islands with reference to the United States, and formed their judgments of what the climate should be. They then considered the influence of the ocean currents upon their climate. They also found what the rainfall of the islands is.

After a study of the general topography, the political divisions were taken into account. Scotland appeared to the children to be made up of three natural divisions—the highlands in the north, the middle lowland region, and the southern uplands. An endeavor was made to have the children picture the surface and appearance of the different sections into which they had divided the country, and to form opinions of what the occupations of the people would be. The conclusions of the children were then corrected or confirmed by the teacher and by reference to the *International Geography*. The children expressed, by means of maps on blackboard and on paper, their ideas of the surface of Scotland.

At present the children are beginning the study of England and Wales, and later they will take up Ireland; they will use the same means of preparation, and in addition *Europe and Other Continents*, Tarr and McMurry's third book. They first considered the relative amounts of highland and lowland in the country, using the scale of colors representing different altitudes, as shown in the atlas. They have observed the direction of the principal rivers and their tributaries, and have thus obtained a knowledge of the slopes of the land and the direction of the mountain chains. They will study the rainfall and climate of the countries by means of the rainfall and isothermal maps in the atlas and in their text-books. They will obtain a knowledge of the natural resources of the islands from their text-books, and will then be ready to study the occupations of the people and to compare them with those of the people of the Middle Ages.

Science.— In considering the life and works of the monks, the children will learn of their book-making and printing. They will read of the tanning of leather for use in the binding of books. To see how tanning is done at present, the class visited a tannery. The following is one of the papers telling of their trip:

OUR VISIT TO A TANNERY.

We visited Huck & Son's tannery on Division street and Elston avenue. When a skin is taken to a tannery it is put into a vat of lime. It is left in the vat for seven days. It is then taken out and the fur scraped off. The skin is put into the lime to loosen the fur. It is then put into another vat to get the lime out of it, for if the lime was left in the skin it would eat the skin up. The skin is then put into a machine which takes the flesh off the skin. After this it is put into a vat, where it is tanned. It is then put into a press to get the water out. After it has been tanned it is put into a machine which splits the skin, or, as the man said, "makes two out of one." By this time the skin has become pretty stiff, so it is put in a large barrel which revolves. Some oil is put in with it, so that when the barrel revolves the oil soaks into the skin and makes it soft. There is still a little flesh on the leather, so it is put into another machine to take this flesh off. After this it is tanned again. After the leather has been tanned the second time it is ready to be dyed. The dye is usually black. The skin is spread out on a large table which slopes slightly toward the middle, and the dye is poured on the leather. Some water is then thrown over it. It is then scraped out smooth and the water taken off. After this the skin is hung up to dry. It is then taken to a place where it is marked.— *Lawrence Smith.*

On their return from the tannery the children were anxious to attempt the tanning of a hide themselves. They decided to get a hide which had been "unhaired" and "fleshed" and made ready to be put into the tannin.

The tannin is made as follows: Dilute a quantity of strong "palmetto extract" (obtainable at a tannery) with water, until it reaches 25 degrees' barkometer strength, then add common salt (in a saturated solution) until the liquor reaches 40 degrees' strength. Each child prepared a pint and a half of this solution in a Mason jar, and, after mixing the liquid thoroughly, put

a portion of the hide to soak in it. In some of the experiments the solution is to be allowed to remain undisturbed until the tannin has struck through; in others the jar is to be shaken at intervals of one day until the skin is tanned; the results in all cases being observed and recorded.

Number.— As the subject-matter of the grade has not required number which made sufficient demands upon the abilities of the children, the number work has been for the most part separate from their other work. The work on the weather records in science requires ability to handle percentage problems. To meet this, drill in such problems has been given.

Applied arts.—The work in bookbinding has been begun. As has been stated before, the work to be done is the binding of magazines and reading lessons for the school. The school has received gifts of old magazines. Where consecutive numbers have been received, it is planned to bind them in volumes, each containing six numbers; but where numbers are not consecutive, the children have taken out those articles which they consider valuable. These they will classify and bind in their respective classifications. It was suggested by the children that they bring books from home to rebind, as practice work, before beginning the binding of the magazines.

Manual training.— The manual-training work of the grade has been the making of sewing benches for the bookbinding. (For a diagram and description of the sewing bench see Mr. Carley's outline on manual training in this number.)

EIGHTH GRADE.

KATHARINE M. STILWELL.

REVIEW FOR JANUARY.

THE outline of work for December and January, as it appeared in December, was not begun until January, because the hand-work for Christmas required much time in December. A few changes were made in details, but the work in general has been carried on as planned.

The proposed isthmian canal proved to be the most interesting of the current events of the month, and perhaps a review of the work done on this topic will prove to be of interest. We took up the subject from the standpoint of an American citizen, beginning with the question as to whether we have any need of a canal. The attempt to answer this question led to an investigation of the trade relations existing between the different sections of our country and between the United States and the rest of the world. The study of our exports and imports —the kind of articles exported and imported, and their value— caused the pupils to read on the South American countries

—Chile, Argentina, and Brazil; on the Asiastic countries—China, Japan, and the Long Plateau; and the Philippine Islands and Porto Rico. In the study of Porto Rico they were materially assisted by a lesson given by Miss Huff, of the pedagogic class, who taught in San Juan last year. This aroused the interest of the pupils to so great a degree that they wrote letters to school children living in San Juan, asking for additional information.

Thus far we had studied the geography of these countries wholly with reference to their relation to America. This led us to feel the necessity for a knowledge of the earth as a whole. In the study of this topic we adhered to the plan outlined, the class expressing the great land masses by modeling in sand. The pupils studied the relation of the various parts of these continents and their means of communication, natural and artificial. This brought about a review of the history of various explorers—Columbus, Cortez, Balboa. It gave the pupils a different standpoint from which to view the work of these men, and led them to see in a new light the problems confronting us as American citizens.

Then followed the study of the surface of the isthmus in order to determine the best geographical location for the canal. The pupils examined pictures and maps, and read articles in Mill's *International Geography; The Earth and its Inhabitants*, by Reclus; the *National Geographic Magazine;* and different geographical readers dealing with the structure, rainfall, and other physiographic features of this region. They expressed the knowledge of the isthmus thus gained by relief maps, modeled in chalk. We used the work that was being done in nature study to make these pictures of climate vivid. The pupils compared the weather conditions in Chicago with the weather conditions on the canal routes. The fact that the records have not been carefully kept at Nicaragua for any length of time was a source of annoyance to one particular pupil, who heretofore has not been interested in keeping his record.

They read the history of the canals published by the daily papers, and then, having enough knowledge of the subject to form an opinion, they ranged themselves into two committees, one side favoring one route, and one the other, and prepared for a debate. They read the *National Geographic Magazine*, the *Report of the Isthmian Canal Commission*, the *Review of Reviews*, the *Outlook*, the *Little Chronicle*, *Scribner's*, the teacher's scrapbook of newspaper clippings, containing a complete account of the canals, and the daily press reports.

Each pupil then wrote a paper, accompanied by a map and drawings, describing the surface of the isthmus and setting forth the advantages of his side of the question. He read his paper to his committee, which chose the strongest three to present their side of the question in the debate. The arguments made are printed below.

The results of this month's study are apparent. The general effect of the debate was good. While the interest was intense, the pupils handled

the subject in an earnest, dignified manner, and without undue partisanship. There has been a gain in the formal studies, reading, writing, and drawing. Map-drawing has received an impetus, not only in the direction of skill, but also in the realization by the pupils that the ability to draw a good map depends not so much upon technique as upon a knowledge of the structure of the country to be drawn. The work in composition showed improvement; the papers were fuller than usual, the arguments stronger, the topics better arranged, and the thoughts expressed in fairly good language.

The study of the Erie canal (see "History" in the seventh-grade outline printed in December) was related closely to the isthmian canal, and interest was likewise shown in that subject. We had already considered the building of the Cumberland road, and its inadequacy to the trade of the frontier. Out of this arose the question of the canal. The pupils discussed its location, the necessity for its construction, its effect and present use; and were led to see its influence in the building of the Illinois and Michigan canal.

NOTE.—In October the eighth grade studied the effect of this canal upon the growth and development of Chicago.

A MORNING EXERCISE BY THE EIGHTH GRADE.

Music—"Ring out, Wild Bells."

Reading—Selections from Walt Whitman's "Passage to India," Miss Stilwell.

Music—"America."

Debate—"*Resolved*, That the Panama route is the best route for the isthmian canal."

AFFIRMATIVE.[1]

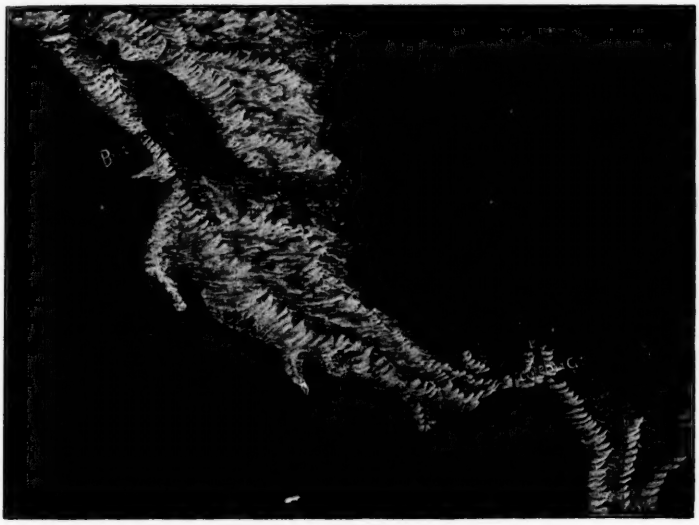
This route combines a very narrow isthmus with a low summit, the width of the isthmus being thirty-six miles in a straight line, with a summit of 300 feet. The canal with all its curves is only forty-nine miles long. The Panama canal will be a lock canal, with its summit level at Lake Bohio. Leaving Colon, the Atlantic terminus, the route then follows along the marshes, to a little place called Gatun, on the Chagres river; from that point it follows the line of this river in a general way to Obispo, thirty miles from Colon. At Obispo the route leaves the Chagres and enters the Emperador cut, which merges into the Great Culebra cut where the line crosses the continental divide; from the latter point its general course lies along a small stream, called the Rio Grande, until it reaches the Pacific at Panama.

The estimated cost of constructing a canal at Panama is $144,000,000; at Nicaragua it is $189,000,000. Some years ago a French company started a Panama canal, and they have offered their rights, $27,000,000 worth of

[1] For lack of space the arguments of the second and third speakers for the affirmative and the negative are summarized.

excavation, railroad stock, valuable maps, drawings, etc., for $40,000,000. Thrown in with this is a very valuable article, that money cannot buy — experience. You may say that the best is always the cheapest. In this case the best is in reality the cheapest. Panama is also cheaper to maintain, costing $2,000,000 yearly, while Nicaragua would cost $3,300,000.

The time estimated to construct a canal at Panama is ten years; at Nicaragua, eight years. Later a member of the commission said: "I believe



THE PANAMA AND NICARAGUA CANAL ROUTES.
(Modeled by eighth-grade pupils.)

the time should be exchanged, making Panama two years shorter than Nicaragua, or at most equal."

A ship could pass through a Panama canal in twelve hours, or in daytime, while it would take thirty-three hours to go through Nicaragua, and would have to tie up two nights. — MONROE COLE.

1. The expense of maintenance will be greater at Nicaragua, owing to the dredging necessary.

2. The expense of building the Panama canal will be less than that of building the Nicaragua.

3. Nicaragua will require eight locks; Panama, five.

4. At Panama there is a railroad the entire length of the canal available for use in construction.

5. By purchase from the French company, buildings for shelter of machinery and laborers, and a well-equipped hospital will be acquired in the bargain.— KATHARINE ROOT.

1. The Panama canal terminates in two natural harbors; the Nicaragua route has none.

2. The present population of the territory through which the Panama canal passes is far greater than that at Nicaragua.

3. Panama has only twenty-two curves; Nicaragua has fifty-six, and these are sharp and difficult.—RUTH CHIPMAN.

NEGATIVE.

The proposed Nicaragua route begins at Greytown, on the Atlantic, extends northwest to the lake, follows a westerly direction through the lake, leaves the lake at Las Lajas, following the Rio Las Lajas valley in a slight southwesterly course, till it crosses the continental divide in its lowest point between Alaska and Cape Horn, and then through the Rio Grande river valley to the Pacific at Brito. The lake was once a bay of the Pacific and has been shut off from the ocean by material thrown up by volcanoes. It is 3,000 square miles in area. Its outlet is the San Juan river, which flows through a coastal plain, made by the sediment carried down from Costa Rica, and it empties through a delta into the Atlantic.

The features of the canal are: the control of the water supply, which is to be done by regulating works, consisting of a masonry dam and an overflow at Conchuda, near the mouth of the San Carlos river; harbors at either terminus; and the construction of locks.

One advantage of this route is the natural lake, so that vessels sailing through the upper course of the river and on Lake Nicaragua will have easy sailing over level water for 117 miles.

The control of the water supply is not automatic, as at Panama, but this is no disadvantage; for having given the number and volume of locks in a canal, and the number of times they will be opened in a day, it is a simple matter to calculate how much water is required to run the canal. Even our opponents could compute it.

The construction of the Conchuda dam is the most important engineering work; but the location selected for the dam makes the work comparatively simple and cheap.

The work at Nicaragua has the advantage, because it can be carried on at many places at the same time. At Panama nearly one-half of the excavation has to be done in one place, on the Culebra cut.

It is therefore evident that the engineering as well as the physical features are in favor of Nicaragua.—ALBERT BUTLER.

1. The Nicaragua route is 500 miles nearer to the United States than is the Panama route.

2. The Nicaragua route is the shortest line for all commerce, excepting that originating or ending on the west coast of South America.

3. The time required to build the Nicaragua canal is estimated by the commission to be eight years; for the Panama, ten years.

4. The climate at Nicaragua is more healthful.

5. The Nicaragua route is more favorable for sailing vessels than the Panama.— HORACE CUTLER.

1. It will be difficult for the United States to acquire a clear title to the Panama canal.

2. The harbors at the extremities of the Panama channel are unsatisfactory, owing to rough seas at Colon and drifting sand. More advantageous harbors can be constructed at Nicaragua at small cost.— MARIE MILLER.

MORNING EXERCISES.

BERTHA PAYNE.

		LEADER.
March 4.	Jeanne d'Arc	Mlle. Ashléman
5.	Early Settlers	Mr. Prokosch
6.	Songs	Mrs. Bradley
7.	Olympia	Mr. Kroh
11.	A Tree Myth	Miss Langley
12.	Life in a Castle	Miss Deratt
13.	Discovery and Invention	Mr. Ira B. Meyers
14.	De la Salle	Mlle. Ashléman
18.	Weather	Miss Mitchell
19.	The Moon and the Weather	Mr. George W. Myers
20.	Art Work	Mr. Duncan
21.	Nature Study	Mr. Jackman
25.	City of Washington	Miss Stilwell
26.	Prehension of Food	Miss Van Hoesen
27.	Nature Observations	Mrs. Atwood
28.	Current Events	Miss Rice
31.	Life of Early Spring	Mr. Ira B. Meyers

HISTORICAL EVENTS AND BIRTHDAYS.

March 1.	William Dean Howells	1837
6.	Michael Angelo	1475
6.	Elizabeth Barrett Browning	1806
6.	General Philip Sheridan	1831
10.	Giuseppe Mazzini died	1872
11.	Torquato Tasso	1544
15.	Andrew Jackson	1767
16.	James Madison	1751
22.	Johann Wolfgang von Goethe died	1842
26.	Sir John Lubbock	1803
28.	Alfred the Great died	901
28.	John Comenius	1592
29.	Raphael Sanzio d' Urbino	1483
31.	Francis Joseph Haydn	1732

Colonel
Francis Wayland Parker

DIRECTOR OF THE SCHOOL OF EDUCATION, UNIVERSITY OF CHICAGO, AND EDITOR OF THE ELEMENTARY SCHOOL TEACHER AND COURSE OF STUDY

Died March 2, 1902

The June number of the present volume will contain memorial words on Colonel Parker's life and work